The Physiotherapy Review

Published Bi-Monthly by The American Physiotherapy Association

Volume 23 May-June Number 3

Anterior Poliomyelitis:

A Review of the Literature from 1840 *to* 1916

Mildred Elson

In view of the recent contributions to the treatment of anterior poliomyelitis it is of interest to review the early literature, for the disease was accurately described by many observers. Many of these observations have been lost in the literature so that what appears to be a new concept or idea often is one which has been described long before. There is such a voluminous amount of material on this subject that it would be a tremendous task adequately to review all of it. Therefore, I have taken excerpts from some of the leading authorities of their particular period and hope that this will incite further interest and study on the subject.

The first clear description of infantile paralysis was given by Jacob Heine[1] in 1840. Unfortunately this article is written in German, and therefore has not been reviewed. In 1874 E. C. Seguin of New York published a monograph on "Spinal Paralysis of the Adult."[2] He described the disease as a rare form of myelitis whose existence had been revealed only within the last few years by the progress of pathological anatomy and physiological analysis. Other observers who have recorded cases of this disease have given it different names, the chief of which are as follows:

Acute anterior spinal paralysis (Duchenne).

Office of Emil D. W. Hauser, M. D., 8 South Michigan Ave., Chicago, Ill.
Instructor in Physical Therapy, Northwestern University Medical School, Chicago, Ill.

Subacute general anterior spinal paralysis (Duchenne).

Spinal paralysis of adults (Meyer, Charcot, Gombault).

Myelitis of the anterior horns (Dujardin-Beaumetz).

Acute spinal paralysis of adults (Petitfils).

An affection of adults like infantile spinal paralysis (M. Bernhardt).

Seguin, however, preferred the names of acute, subacute, chronic spinal paralysis of adults; or, inflammation of the motor tract of the spinal cord. He described the symptoms as follows:

A. Dysesthesia and slight temporary anesthesia.

B. Paresis and akinesis, both these symptoms affecting the extremities, and in rare cases, the face, eyes, tongue, and throat; not affecting the respiratory muscles, nor those of the back and abdomen, not the bladder, nor the sphincter ani. Muscular atrophy in the paralyzed parts.

C. Loss of electro muscular contractility (to faradic current) in the atrophied muscles. A strong tendency to spontaneous retrocession of the palsy and to spontaneous cure.

D. The important negative characters of this affection are:

1. Absence of palsy of bladder, or of

sphincter ani, or of respiratory muscles.
2. No bed sores.
3. No great and extensive anesthesia.
4. No spinal epilepsy.

Pathology

A. The autopsy of Gombault's patient revealed no lesion visible to the naked eye in the brain or spinal cord.

Etiology

A. Age—adolescents from seven to eighteen seem to be immune.
B. Catching cold seems to be a predisposing factor.

Prognosis

A. None of the subjects died of the paralysis with the exception of one case, and she had an intercurrent affection.
B. The prognosis relating to the paralysis is only moderately good.

Treatment

A. The early stage, in the acute and subacute forms, should be treated by counterirritation to the spinal region, dry cups, actual cautery, or leeches.
B. Nutrition should be furthered and constipation prevented.
C. Pain, if severe, may be relieved by means of liniments, or simple warm wraps.
D. After the early stage, the treatment resolves itself into attempts to restore the nutrition and force of the muscles. This is done by the galvanic current and later by the faradic.

In 1890 Medin published his observations of an epidemic of forty-four cases in Sweden. He observed that there were other types in addition to the spinal form and described the bulbar, ataxic, encephalitic and polyneuritic. He also recognized that the disease was an acute infection which might appear either in endemic or epidemic proportions. Wickman, a Swedish pathologist, in an excellent monograph called "Acute Poliomyelitis, or Heine-Medin's Disease,"[3] added considerable to the knowledge of the disease, as shown by the following excerpts.

According to the course of the disease, the seat of the paralysis, the predominance of isolated symptoms, and other features, Wickman has distinguished the following forms of Heine-Medin's disease:

1. The spinal poliomyelitic form.
2. The form resembling Landry's paralysis.
3. The bulbar or pontine.
4. The encephalitic.
5. The ataxic.
6. The polyneuritic (resembling neuritis).
7. The meningitic.
8. The abortive.

His description of the spinal poliomyelitic type is much the same as it is given in the present day textbooks. He recognizes three stages of the disease—acute, stage of repair and achronic definitive stage. In the so-called Landry's type, Wickman showed that fatal cases of acute poliomyelitis ended in exactly the same clinical picture as Landry's paralysis and that many cases, which were recorded as Landry's paralysis with myelitic changes, were merely acute poliomyelitis. These statements were corroborated in subsequent epidemics.

This type affects mostly the leg. After initial general symptoms, paralysis in the legs develops and progresses upwards to attack first the muscles of the abdomen and back, then the arm and neck, and finally bulbar symptoms appear. Cranial nerves are attacked, and as the respiratory center is implicated, dyspnea appears. Death occurs on the third or fourth day. Generally, consciousness remains clear until the very end; more rarely, coma precedes death; occasionally, Cheyne-Stokes' respiration appears. Sensibility is either normal or only slightly reduced.

The Bulbar (Medin) or Pontine Type (Oppenheim). Medin was the first to mention the involvement of the cranial nerves as a not uncommon complication of infantile paralysis. He further recognized the etiological connection of certain isolated cerebral nerve palsies with infantile spinal paralysis.

In discussing the spinal type it has been mentioned that not infrequently the cranial nerves are attacked. Yet there are cases which show only symptoms of infection of the bulb, pons or brain stem. Inflammatory changes are the basis of the signs of affection of the bulb and brain stem. The seventh nerve is the most frequently attacked, and as a rule the upper as well as the lower branch is implicated. The paralysis may be combined with atrophy and loss of electrical excitability.

As Heine-Medin's disease, during an epidemic, may express itself as a facial palsy, we may accept that, in sporadic cases, the disease may assume the same guise. Hence, some facial palsies which have been attributed to lesions of the seventh nerve trunk may really be due to inflammatory changes.

The Cerebral Encephalitic Type. Strümpell, Wickman stated, was the first to give us a complete description of the cerebral type of Heine-Medin's disease which he called "acute encephalitis in children." Pierre Marie in France also

recognized this symptom complex as a disease entity.

Strümpell describes the disease as follows: "After an initial stage, in which fever, vomiting and well marked convulsions occur, paralysis develops. It may be a hemiplegia, a monoplegia, or a facial paralysis, but it has the usual characters of a cerebral paralysis. In a number of cases, signs of motor irritation persist. Many patients show symptoms of epilepsy through life. In some the epileptic convulsions are confined to the afflicted side, but more frequently they are generalized epileptic seizures. Athetosis, chiefly of the hands, follows more often than epilepsy. Disturbance of speech sometimes appears; more often, a diminution of intelligence and moral deterioration are observed."

From his observations in epidemics and from all the facts at his disposal, Wickman concluded that it is probable that in man the virus of Heine-Medin's disease may cause encephalitic changes. Symptoms, therefore, may arise in this disease of a very variable but distinctly encephalitic character. Occasionally, the encephalitic affection may assume the form of a hemiplegia, but this is rarer and of better prognosis than formerly was thought. Further exact observations are much needed on this subject, he felt.

Ataxic Type. Medin observed during an epidemic of infantile paralysis that some cases showed only or chiefly ataxic symptoms. He compared these motor disturbances with those of Friedreich's ataxia. Wickman also observed instances in which ataxic symptoms were especially conspicuous. The ataxia was sometimes of a distinctly cerebellar type, but here paralysis of cranial, and, to a lesser degree, of spinal nerves also occurred. Ataxia was frequently observed in subsequent epidemics, and its presence was mentioned by Zappert, Spieler, Lindner and Mally.

Polyneuritic Type. In the description of the initial symptoms, pain and general tenderness were mentioned as usual features of Heine-Medin's disease. If the pain is severe and is accompanied by tenderness of pressure over nerve trunks, we have a picture which corresponds completely with the disease described in all textbooks as peripheral neuritis. When these symptoms sporadically appear, a diagnosis of peripheral neuritis is made.

Medin first observed in an epidemic of infantile paralysis cases which resembled neuritis; and during the epidemic of 1905 Wickman and numerous other Swedish physicians encountered similar cases. Although we therefore can say that the existence of a neuritis in Heine-Medin's disease has not been demonstrated histologically, we cannot completely exclude its possibility.

The Meningitic Type. The signs of meningeal irritation, which often can be observed in Heine-Medin's disease, may, under certain conditions, attain such prominence as convincingly to resemble some form of meningitis. Vomiting, headache, pain and rigidity in the neck and back, opisthotonus, Kernig's sign, tonic and clonic spasms, strabismus, coma, etc.—all the symptoms of an acute meningitis in all degrees and in all possible combinations may be added to the picture of the disease. Only in the chronic stage does the course differ from that of a meningitis. In most cases, the signs of irritation cease and the characteristic palsies of Heine-Medin's disease become evident. In some, the disease, even after it has assumed a most threatening aspect, disappears in a tolerably short time and an astoundingly complete recovery ensues. In others, under a more or less stormy aspect, the malady runs a lethal course.

During the Swedish epidemic, numerous transitions from distinct meningitis to typical poliomyelitis were observed. Upon this clinical basis and upon the epidemic connection of these meningitic cases with proven poliomyelitis, Wickman established a special meningitic form of Heine-Medin's disease.

How closely Heine-Medin's disease may resemble ordinary meningitis has just been narrated. The knowledge of this meningitic form helps us to explain the statements of observers such as Caverly and Macphail, and Mackenzie, who reported that cerebrospinal meningitis and poliomyelitis may occur simultaneously. It also bares the foundation of the belief that these two diseases are related. Wickman proved that where exact data were available no such relationship existed and he suggested that in both of the recent American outbreaks * numerous and definite cases of the meningitic form of Heine-Medin's disease, alone, occurred.

The Abortive Type. Wickman was the first to describe the abortive case. He noted that during the Swedish epidemic of 1905 in the immediate neighborhood of well-defined cases of poliomyelitis, and in distinct etiological connection with them, many patients were discovered who showed only general symptoms of being ill and presented no signs of paralysis. The patient presented symptoms typical of the initial stage of infantile paralysis, but these symptoms were not followed

*The epidemics here referred to probably were those which occurred prior to 1911.

by paralysis. He also distinguished the following varieties of the abortive type:

a. Cases running the course of a general infection.
b. Cases in which signs of meningeal irritation are especially prominent ("pseudo-meningism").
c. Cases accompanied by distinct tenderness ("pseudo-influenzal").
d. Cases with gastro-intestinal disturbances.

Wickman recognized the need for isolation, not only of the paralytic but also of the abortive cases and the healthy virus agents. He recommended that the schools be closed for several weeks. He realized that there was no exact information as to the amount of isolation time necessary. Most physicians in the Swedish epidemic were content with three weeks. Experimental poliomyelitis in monkeys has shown that we may deem the intestinal and nasal mucosae and the salivary glands as excretory channels for the virus. It therefore is advisable in the early stages to disinfect the intestinal and nasal discharges.

Active treatment, Wickman felt, could be safely initiated at the end of the second or third weeks without harm to the patient. Resorption and reparation are occurring then and further advance of the disease need not be feared. He recommended warm water baths, massage, passive and active movements, and that rational physical therapy be practiced as early, as thoroughly and as continuously as possible.

Even if we fail to procure recovery, we can at least pave the way for the subsequent orthopedic treatment to restore function. This manual treatment must be performed by one whose hand is skilled.

Wickman saw no value in electrical treatment.

Frost, in Public Health Bulletin No. 44,[4] has given an excellent description of the disease, the epidemiology and the symptomatology up to 1911. He quotes Wickman rather widely, and therefore any review of his work would be a repetition of that just presented.

The first epidemic in the United States occurred in Vermont in the summer of 1894. There were 123 cases, and Charles S. Caverly[5] collected case reports on all but six of these cases. A very complete study was made of the epidemic and they found that during the epidemic in the same geographical area an acute nervous disease, paralytic in its nature, affected domestic animals. Horses, dogs and fowls died with these symptoms. The thoroughness with which the health officers studied the disease is noteworthy, and much valuable data was collected which was useful in subsequent epidemics in Vermont in 1910, 1911, 1912 and 1913. The part played by the sporadic and abortive cases and by the microbe carriers were recognized and understood. They advised that special attention be given to the noses and throats in cases and to those in contact with cases; that all excreta, especially all nasal and mouth discharges from cases should be disinfected; that in the presence of the disease, insects (especially flies) should be carefully excluded from the sick room and house, and the breeding places of flies destroyed.

Caverly[6] called attention to the fact that the disease could attack adults and that it could occur in cold weather. A serious outbreak occurred in the year of 1914. It was during this year that an anonymous friend of the state placed at the disposal of the State Board of Health a considerable sum of money for the purpose of doing independent and original research into the nature of this baffling disease. This enabled the state to call on Dr. Simon Flexner of the Rockefeller Institute of Medical Research for advice, as well as Dr. Francis R. Fraser, Presbyterian Hospital, New York City; Dr. Harold L. Amoss of the Rockefeller Institute and Dr. Robert Lovett of the Children's Hospital in Boston. An educational program was instituted with the purpose of giving the medical profession in the state the latest knowledge in regard to the diagnosis and phophylaxis of the disease, especially emphasizing the importance of abortive and carrier cases in its epidemiology.

Lovett[7] made a preliminary report on the treatment of infantile paralysis based on a study of the 1914 epidemic in Vermont. He recognized the value of muscle training and the use of the affected muscles so far as possible, but pointed out that little was known of the effect of muscle fatigue on the paralyzed or partly paralyzed members. It was during this epidemic that the first muscle testing chart was evolved in order that progress could be noted. Lovett had advised that massage not be given until after sensitiveness had disappeared. He stated, however, that this rested on theoretical considerations and on empiric grounds. He did advise frequent changes of position and immersion in a warm bath with whatever active movement under water could be accomplished without discomfort. He emphasized that the general condition of the patient should not be neglected. Muscle training, he stated, rests on a sound physiologic basis and works out empirically better than any of the other measures, and the large proportion of partial paralysis in

the cases observed shows its reasonableness. Muscle training in its most obvious form consists in aiding the patient to perform a certain movement with the hope of stimulating an impulse from the brain to the muscles. Another equally useful form of muscle training, Lovett pointed out, consists in getting the patient on his feet at the earliest possible moment in order to call forth the instinctive muscular actions induced by the efforts and balance. He advised apparatus when necessary and felt that the fear that the early use of apparatus would promote muscular atrophy was wholly unreasonable because disuse was bad. Braces should mean the upright position, and the upright position means more muscular activity. The best way to avoid wearing a brace permanently, he felt, was to put it on early and keep it on only as long as necessary.

E. J. Martin,[8] Ph. D., of Harvard University Physiology Department, devised a system of muscle measurement by means of the spring balance. Through a study of cases by means of the spring balance and manual muscle tests, the following data were observed in Vermont; the period covered was three months:

"The change of improvement in affected but not totally paralyzed muscles under expert treatment by muscle training was about 6 to 1, under supervised home exercises 3.5 to 1, under home exercises without supervision 2.8 to 1, while untreated affected muscles in these patients showed an improvement ratio of 1.9 to 1. These figures represent cases at the end of the first year. They are all from the Vermont group and were treated there."

Through this study it was also brought out that fatigue and over-treatment by massage and exercises were detrimental factors of the highest importance. It was Lovett's[8] opinion that the advice often given to use affected limbs as much as possible was the worst advice that could be given. He stated that it is difficult to underuse such muscles, but fatally easy to injure them by overuse.

Frauenthal and Manning[9] reclassified poliomyelitis into the following types:

I. *The Arrested Type.* (Most frequent. Abortive; old classification.)

II. *The Spinal Myelitic Type.* (Flaccid paralysis.)

III. *Acute Ascending or Descending Spinal Paralysis.* (Landry's. Separation from Type II arbitrary. Both spinal origin.)

IV. *Acute Bulbar.* (Cranial nerve paralysis: facial, auditory, hypoglossal, oculomotor.)

V. *Encephalic Type.* — Polioencephalitis superior: Rolandic cortex—spastic hemiplegias. Frontal area—mental defectives. Occipital area—blindness with normal eyegrounds.

Polioencephalitis inferior: Acute bulbar-pontine type; see above.

Encephalitic cerebelli. The predominant *acute ataxia type.*

Encephalitis of midbrain and connections. *Acute tremor.*

Thalamic encephalitis. Spastic para-or hemiplegias associated with athetoid and choreic movements and tetany.

VI. *Meningitic Type.*—With or without paralysis.

VII. *Neural Type.*—Acute multiple neuritis. Sciatica. Herpes zoster. Chorea.

VIII. *Rapidly Fatal Institutional Disease Type.*

Their discussion of the disease follows very much that of Wickman. They pointed out that it is the approach of the confusing meningeal type of poliomyelitis early in an epidemic which has led physicians to believe that they were facing an epidemic of cerebrospinal meningitis. Meningitic symptoms are characteristic and may predominate. A paralysis may follow which at once clears the diagnosis, but a good many cases recover or die with no paralysis. Two case reports are given; one mild and one severe:

Case: Meningeal Type; Mild.—E. T., male, 8 years; Sept. 25, 1908; headache; pain in neck; severe pain in back; temperature 102 F.; no other case in house, but several in village. Comatose for several days; no paralysis; "meningeal type, no spinal symptoms." (Dr. Bowles, Eleva, Wis.)

Severe Case of Meningeal Type.—One case gave as exact a picture of meningitis as can be imagined. The child was unconscious, back bowed, buttocks and head sustaining weight of child if placed on back, spinal column as stiff as a board, spastic paralysis of arms and legs, rotation of eyeballs, mumbling and groaning, arms crossed rigidly over chest, and legs flexed and stiff from contraction of hamstring muscles. Temperature 104.2 F.; pulse 140; respiration very fast and labored. Such a case required close work to differentiate. A lumbar puncture gave a clear fluid which escaped under great tension at first. The specimen centrifuged and stained showed only mononuclear lymphocytes. There were no intracellular organisms and no polymorphonuclear cells. (Hallett and Shidler; Shidler, Pediatrics, 1910.)

In their description of the treatment of the preparalytic stage, attention was given to isolation and medical care. Ice bags to the spine and

to the neck were advised for children with high fever. Absolute rest in bed they considered an important measure with frequent changes of position. Special mention was made of opposing any method of rigid immobilization. They stated that the "inquisition furnished no more cruel measure than the application . . . of a plaster jacket during the acute stage of poliomyelitis. It has been advocated to immobilize the spine during the period of muscular excitability, as we would any acutely inflamed joint with muscular spasm.' Some of these children lie rigid, 'stiff as a log from head to heels,' and the advantage of artificial immobilization is not obvious in these cases; the majority of children and adults present a beginning opisthotonos; the mildest form may be that of a nuchal rigidity, with the head slightly extended; the severe grade is hyperextension of spine to the bent-bow outline from head to buttocks, with extreme flexion of leg on thigh. If measures which assist relaxation are not promptly inaugurated, inexorable nature pursues her own method of relaxation and a flaccid paralysis ensues. . . .

"The disadvantages of permitting a continuous dorsal decubitus are: a possible hypostatic congestion augmenting the spinal congestion of the lesion; the initiation of bed sores, which have given serious trouble when trophic disturbance accompanied the motor and sensory changes, and the very real danger of hypostatic congestion of the lungs should respiratory paralysis present."

The value of hydrotherapy in conjunction with other forms of medical treatment which they described, they felt compelled serious consideration. Cold sponging and cool immersion baths aid in controlling temperature by abstracting and diffusing heat, and thus assist and renew the body tissues in their warfare against the destructive virus. The bath also relieves pain to some degree by providing a buoyant supporting medium which equalizes and distributes pressure, conducive at least to brief relaxation and rest.

They recognized the need for intelligent, steady and firm handling of these patients during the administration of pack or bath. They advocated a portable bathtub and a bed lift with pulley and tackle with a rigid framework on which the patient reclined as the best means of transportation between bed and bath. As the fever declined the temperature of the bath was gradually increased. If the pain is still present at this stage, they advised heat by means of hot water bath, electric pad, hot sand bags and hot immersion bath. Passive movements were begun as soon as pain ceased to be a constant factor in the paralyzed extremities. They were started under water.

Application of the high-frequency current to the cutaneous surfaces of the spinal column was recommended at the earliest moment after motor incoordination and other signs and symptoms confirmed a suspected diagnosis of infantile paralysis. They advised the current to be applied five minutes, twice daily. This treatment, they stated, stimulated vasomotor contraction of the hyperemic vessels and tended to reduce or prevent further extravasation of their fluid contents, sterilizes the infected tissues and inhibits the progress of the ascending lesion.

They advised combined galvanic and faradic current in the early treatment. They felt that a mild current applied only to the origin and insertion of the affected muscle for a brief period once daily offered the only known means of inhibiting muscular atrophy until such time as a beginning regeneration of the nerve-supply of the part obtains peripheral function. Too much stress, they felt, had been layed upon the reaction of degeneration, that the failure to obtain a muscle contraction by galvanic or faradic current was not always an evidence of degeneration but rather that the cutaneous surfaces would not tolerate the pain of the current.

Physical therapy, they stated, is the reliance of the physician throughout the total period of treatment of paralytic cases. Massage, passive movements, resistance exercises, muscle training and reeducation were described and advised.

Wilbur[10] wrote an excellent article on the early diagnosis of epidemic poliomyelitis which includes a very complete bibliography of 125 references. He summed up the problems of diagnosis so well that I have taken the liberty of quoting him as follows:

". . . It is unfortunate that our knowledge of this scourge has been so confused by the paramount importance given to its striking complication, the paralysis. The very term 'infantile paralysis' is a misnomer and must be dropped from our list of names, for the disease is far from being one confined to infants and it is more than likely that paralyses including even those that are transient, occur in but a moderate percentage of those who are suffering from it. Physicians must learn to consider the paralyses only as corroborative evidence of poliomyelitis. . . .

"Knowledge of the disease has come to the physician wrong end foremost and to get the idea of paralysis out of mind and substitute therefor the picture of an acute infectious disease with general involvement of much of the body and

particularly of the nervous system is required before early diagnosis and successful treatment of poliomyelitis will be possible. In other words, the usual and ofttimes unconscious conception of the disease interferes with its prompt recognition. How few physicians consider poliomyelitis as a possibility in acute abdominal pain; and yet a study of it shows how commonly such pains occur in its course together with various intestinal, gastric and peritoneal symptoms. Transient meningismus with intestinal disturbance; rheumatic pains after exposure; traumatisms with resultant pain, weakness and inability to use the limbs; headaches and neuralgic pains with later facial paralysis; urinary retention after a long cold ride; a rash over the chest and abdomen with obstinate constipation; lacunar tonsillitis with peripheral pains and weakness, are all common enough clinical pictures and yet all may be the early and perhaps the only evidence of a poliomyelitis. It is in this complexity of symptomatology and because of the abortive cases that the great difficulty of diagnosis lies, and it will continue to do so until some proper specific test is discovered. During epidemics diagnosis is much more apt to be made, but even then many patients will recover without the cause of their ailment being clearly made out. It is probable from the fleeting character of many cases, the temporary diarrheas of those members of afflicted families who escape, perhaps 'poliomyelitis carriers,' the separated foci of infection, the paralytic infections of animals noted along with most epidemics that many individuals have but slight susceptibility to the disease and that trauma, fatigue, general nervous susceptibility, indigestion and concomitant infections all play a part in furthering the invasion and development of the virus in the individual patient. . . .

"The variability of poliomyelitis is one of its most puzzling and evident features. For instance in the ten acute cases observed by me in California during 1911 three only were of the typical spinal type with resultant limb paralysis; of the other seven, three would be classified as 'abortive,' having only transient inability to use certain muscles or aversion to their use because of pain, one died with acute ascending paralysis (Landry's), one had mild meningitic symptoms resembling the meningismus complex, one had polioencephalitis with resultant hemipelgia and later death, one had simultaneously spastic and flaccid paralysis of different parts of the body with bulbar symptoms. While in practically all of these cases the nervous system was the one primarily involved yet in them all enough other systems were disturbed to make the early diagnosis difficult. . . .

". . . Since apparently all cases show besides the characteristic hyperemia of the brain membranes at least some pial inflammation (Dauber and later Wickman), a careful search for nervous symptoms becomes imperative to explain the general picture, which is that of an acute infection with sudden onset accompanied usually by general malaise, headache, unexplained spontaneous pains and hyperesthesias of various parts of the body, undue weakness, fever with profuse sweats, various gastro-intestinal symptoms (vomiting, constipation, distension of the abdomen, etc.) and a fast weak pulse. The discovery of changed or absent reflexes, marked hyperesthesia, neck-rigidity, stiffness of back, projectile vomiting, unexplained restlessness, stupor, coma, urinary retention, slight incoordinations of muscular movements or muscular twitchings will often clear up the situation, but unless thought of and sought for they are easily overlooked.

"In general it should be the aim of the clinician to attempt to eliminate poliomyelitis in all of the ordinary febrile states, above all if they present symptoms distinctly referable to the nervous system. It is well to remember that in any epidemic there is a tendency for one of the types, respiratory, gastro-intestinal, etc., to predominate. One must not seek though for a single picture but with the intricate pathology in mind look for any one of a series of conditions which may dissolve readily either into a more complicated or a simpler symptom-complex or may stop abruptly at any point. It is this variability together with the firm association of the disease with paralysis, both in the mind of layman and physician, that is apt to lead to doubt as to the validity of a diagnosis in the preparalytic period and in the abortive cases. With age no longer a factor (for cases from four months to sixty-four years were reported in the Washington epidemic alone), with paralysis no longer needed for diagnosis, with the certainty that a lasting paralysis may follow the most innocent of prodromal symptoms, with the wide range of clinical possibilities resulting from the destructive processes in the nervous system we now have certainly no more complicated and no more important problem that the diagnosis of epidemic poliomyelitis."

All technicians treating anterior poliomyelitis should have some knowledge of the history of the disease—pathology, pathogenesis, epidemiology, symptomatology and treatment. Those who are relatively new in the profession may not realize the amount of research which has been done. We

must not make the mistake, as Wilbur pointed out, of having knowledge of the disease come to us "wrong end foremost." We must get the idea of a single set of symptoms out of our minds and substitute the picture of an acute infectious disease with general involvement of much of the body and particularly of the nervous system.

REFERENCES

1. Heine, J.: Beobachtungen über Lähmungszustände der unteren Extremitäten und deren Behandlung. Stuttgart, F. H. Köhler, 1840.
2. Seguin, E. C.: Spinal Paralysis of the Adult. D. Appleton and Company, New York, 1874.
3. Wickman, I.: Acute Poliomyelitis. Nervous and Mental Diseases. Monograph Series, No. 16, 1913.
4. Frost, Wade H.: Acute Anterior Poliomyelitis. Public Health Bulletin No. 44, Government Printing Office, 1911.
5. Caverly, Charles S.: Preliminary Report of an Epidemic of Paralytic Disease, Occurring in Vermont, in the Summer of 1894. Yale Medical Journal, Nov. 1894. Reprinted in "Infantile Paralysis in Vermont," Vermont State Dept. of Public Health, 1924.
6. Caverly, Charles S.: Epidemic Poliomyelitis: A Review of the Epidemics of 1914 and 1915. Bulletin of Vermont State Board of Health, Vol. XVI, No. 4.
7. Lovett, Robert W.; The Treatment of Infantile Paralysis: Preliminary Report Based on a Study of the Vermont Epidemic of 1914. Journal of the American Medical Assoc., June 26, 1915.
8. Lovett, Robert W., and Martin, E. G.: The Spring Balance Muscle Test. Amer. J. Orthopedic Surgery, Vol. XIV, No. 7, July 1916.
9. Frauenthal, Henry W. and Manning, Jacolyn Van Vliet: A Manual of Infantile Paralysis with Modern Methods of Treatment. F. A. Davis Company, Phila., 1914.
10. Wilbur, Ray Lyman: Early Diagnosis of Epidemic Poliomyelitis, Calif. State J. Med., Vol. X, No. 10, Oct. 1912.

Physical Therapy

The importance that is attached to the department of physical therapy varies considerably among different types of hospitals. In every hospital, however, it should be considered an essential service. It has long been rated as one of the leading services in orthopedic hospitals. A 300 bed orthopedic dispensary and hospital in New York City, for example, reported the impressive total of 72,248 treatments during the year 1941. These included thermotherapy, underwater exercises, massage, active and passive corrective exercises, ultraviolet and galvanic, faradic and sinusoidal treatments. By way of comparison, a slightly larger general hospital in a nearby city reported 7,539 physical therapy treatments in 1941. This shows that the demand exists in all hospitals, although a wider range of treatments is needed in the orthopedic institution.

The Kenny method of treatment for acute poliomyelitis is making extra demands upon the department of physical therapy. The muscle re-education should be administered by a physical therapy technician who has been especially trained in the methods. It cannot well be undertaken by a nurse who has not had the physical therapy training.

As scientific procedure under the supervision of specially trained physicians, modern physical therapy originated during World War I. There is every indication that the second war will give it renewed impetus. The demand for trained technicians by the armed services already is large and undoubtedly will be increased as the need for rehabilitation grows. The only way in which hospitals can keep an adequate staff in this department is to train technicians when conditions are suitable. Standards for such training have been established by the American Physiotherapy Association. The status of the physical therapy technician is being improved through registration with the American Registry of Physical Therapy Technicians.

Organization, planning, records, procedure and conferences are as important in the operation of the physical therapy department as in any other scientific service. A Minimum Standard and description of the subject of physical therapy in general appear in the *Manual of Hospital Standardization.*

—From Twenty-Fifth Annual Hospital Standardization Report, Bull. American College of Surgeons, Oct. 1942.

The Home Care of Acute Poliomyelitis Using Kenny Technic:

A Case Study

Eloise Draper

Kenny technic for acute poliomyelitis was used successfully in three cases cared for at home during 1942. One of the cases is presented to show how home devices, supplies and management worked and how the Public Health Nurse and physical therapy technician met the situation. Such a description seems timely in view of the present wartime shortage of nurses, physicians, hospital space and special equipment.

The case was diagnosed definitely as poliomyelitis by the attending physician three days following onset of the symptoms. The City Health Department was notified and they sent a nurse. Quarantine procedures were put into effect and the mother was taught the necessary care and isolation technic. No hospital orders were carried out with more care.

When the physician recommended Kenny technic the family contacted a physical therapy technician who had trained in the University of Minnesota under Sister Kenny's supervision. By telephone the mother was asked to have the following ready for the technician's visit:

1 clothes wringer and tub.
1 large stew pot with lid.
2 wool blankets for the bed.
1 sheet.
2 old worn blankets—wool but not 'all wool'.
an old raincoat, rubberized cloth or oil cloth (about 2 yards).
2 old diapers.
plenty of safety pins.
1 board—size of bed, preferably plywood wall board ½ inch thick (for fracture board).
1 board approximately 48x36x1.

The technician and the Public Health Nurse arranged to call at the same time to help the mother set up for hot packing and to teach her the Kenny method. On arrival they changed to gown and mask and went in to see the patient.

45 North Eighth Avenue, Mount Vernon, N. Y.

First Analysis

They saw an acutely ill boy of 7 years, thin, restless, irritable, whose every motion was painful. He lay in an arc to the right and preferred to keep his arms above his head. He had no appetite and had not slept much for three nights.

In accordance with Sister Kenny's recommendation, the patient was not touched during the examination. Also, as she advocates, it was assumed that the neck and back were involved. The patient presented a clear case of exaggerated spasm in:

Pectoralis major—right
Brachialis anticus—bilateral
Brachio-radialis—right
Lateral abdominals—right
Psoas major—bilateral
Hamstrings—bilateral
Gastrocnemius—bilateral

There was complete inability to move his left foot and toes.

Preparation

The material which had been requested was on hand, and the procedure was as follows:

a. Fracture board—4 ply wooden wall board—was placed under the mattress.

b. Bed was made up with the woolen blankets instead of sheets.

c. Sheet folded into a draw sheet (about 24 inches wide).

d. Foot board was placed. This proved to be two planks about 1x4x48 which the father had found at home. These were placed upright at the end of the bed just inside the foot board and braced against the bed frame standing about 6 inches apart.

e. The top cover blanket was lifted over the foot boards to keep it from touching the patient's feet.

f. The patient was moved down toward the the lower end of the bed and the draw sheet

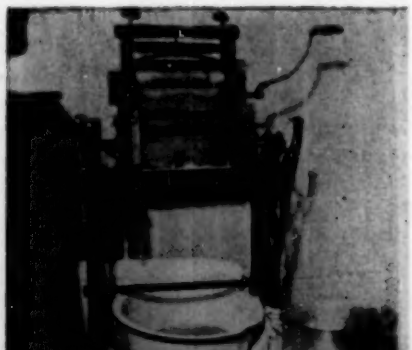


Figure 1

was placed under the buttocks.

Since the bed was one with a solid wooden head board which was hard against the wall it did not seem necessary to use the draft preventing head board covering which Sister Kenny recommends for the metal hospital beds.

g. The packs: The old woolen blankets were measured and torn or cut to size for back, neck (triangular), shoulders, arms, right forearm, abdomen, thighs, legs, and left foot.

These were put on to boil while the pack coverings were cut. There was an old raincoat and one yard of rubber sheeting, but two thigh packs had to be covered with oil cloth. (This proved unsatisfactory as to lasting quality but served adequately as waterproofing for the time being.) Coverings for the waterproofing were made from baby blankets and remnants of the blankets already cut. Then the coverings and waterproofing were laid out ready for the hot foments.

An ordinary "garden variety" clothes wringer had been dug up from some scrap collected in the cellar. It was going to a different kind of war service than originally intended. This was set up in the kitchen, and the hot packs, lifted with a metal pot lifter, were wrung and carried together to the waiting patient. The physical therapy technician applied the first set of packs completely, the mother and nurse assisting. The plan was as follows:

1. Thighs—both
2. Back and abdomen—a diaper was used as a binder to hold these in place.
3. Shoulders, neck and pectoral packs were placed and the second diaper used as a binder about the chest. This was allowed to be slightly loose so the patient would have no feeling of choking or breathing discomfort.
4. Both arms and right forearm.
5. Both legs and left foot.

The mother was given recommendations which Sister Kenny advises about packing:[1]

1. Packs every hour until eight a day had been applied.
2. Packs to be left off for an hour after lunch.
3. Packs to be left off during the night, dried and aired.
4. If during the day the patient is sleeping, a change of packs was to wait until he wakened, for sleep relaxes the patient.
5. Patient was to have no bathroom privileges.
6. He was to lie daily for an hour, at least, on his abdomen with his feet over the lower edge of the mattress.
7. General baths were omitted, and only the necessary cleansing permitted.

This whole procedure had taken about an hour and the patient in packs felt more comfortable. The nurse and technician stayed and helped the mother apply the second pack. She was particularly apt and mastered the idea quickly. It was emphasized that the packs must be applied as hot as it was possible to keep them between the boiling and the applying, so that the muscle re-education could be successful.[2]

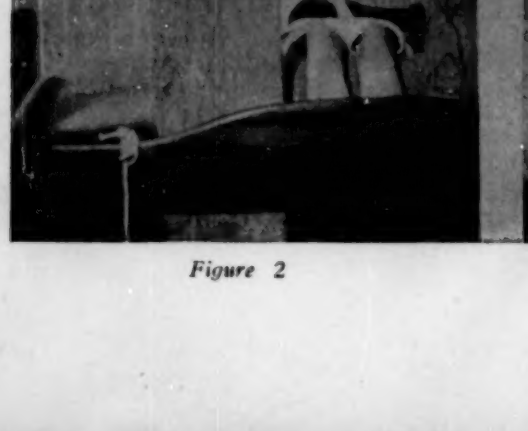


Figure 2

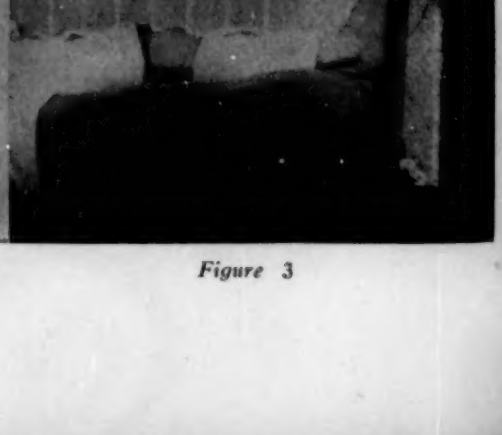


Figure 3

THE HOUSEHOLD

It was a long hard job that the mother of this patient had undertaken. She had two other children, a girl 5 and a boy 2 besides her husband, but she was eager to learn and glad to be able to "do something." When the technician returned next day, she found a much happier and more orderly household. Already things were organized. The father had taken over the cooking. One bathroom was turned over to the mother who kept all her dishes and toilet articles as well as those of the patient there, separate from those of the rest of the family. Though both the other children were preschool age they understood that the mother could not comfort their hurts or care for them as usual and they were managing admirably.

The father had rigged up an apparatus for wringing packs to save both energy and time and keep the packs hot for application. An old sewing machine frame was set up by the bed and the wringer securely clamped to the cross pieces. Under it was a large tub to catch the drip. The boiling packs were carried to the bedroom, wrung out and immediately applied. The technician applied the packs again for the mother and found them satisfactory.

SECOND DAY ANALYSIS

The patient was brighter today, had slept all night for the first time since onset and, though irritable when he moved, was interested in the procedure and was asking for the packs "to be hot—but don't press," a characteristic demand of all receiving this treatment.

It was easier to make a more complete analysis on this second visit. The patient showed:

Prone: Neck pain, spasm present but equal

Back painful, tight but equal

Shoulders, right upper trapezius and rhomboid major and minor alienated.

Gluteal fold wide, appeared like the letter S. Left gluteus maximus, medius and minimus in obvious spasm right gluteus maximus, medius and minimus completely alienated.

Hamstrings in spasm, bilaterally; left semitendenosis and semimembranosis in very strong spasm.

Supine: Patient preferred to lie with arms over head

He lay in an arc to the right

Presented a prominent right anterior superior iliac spine with right rib cage nearer iliac crest than on left

Pectoralis major on right less tense, spasm still present

Quadriceps apparently alienated bilaterally

Left tibialis anticus and peroneus tertius alienated

Left tibialis posticus and peroneus longus alienated; no active motion in the toes, flexors and extensors alienated

General: More comfortable, taking more nourishment although still not appreciative of food.

TENDON STIMULATION AND MUSCLE REEDUCATION

Pain had subsided in the legs and arms on the third day so that tendon stimulation could be begun. Work began with the tibialis anticus and posticus and peroneus longus and tertius bilaterally and with the coracobrachialis and brachio radialis and brachialis anticus bilaterally. More tendon stimulation was added daily and on the tenth day of packing all the body parts affected were included; the patient also could use the foot board with comfort. The foot boards were separated when the patient lay prone, and when on his back the boards were moved together so the feet could be placed against them.

As stimulation of tendons and motion did not produce spasm and pain the exercises for muscle reeduction were started. Alienated muscles began to respond and the toe tendons showed signs of life. There still was no response in the right gluteal group.

The boy, a meticulous lad, took pride in perfectly executed exercises and seldom ran into difficulty. According to his mother he was inclined to moodiness, but only twice during the three months of daily treatment was it necessary to discontinue work because of a mood.

The mother applied the packs faithfully. She had no help except that given intermittently by the physical therapy technician and the Public Health Nurse who timed their visits separately in order to give her some help. Quarantine kept out neighborly help offered by friends. After ten days of this routine, however, the boy, the mother, the nurse and technician were working together like a team. The physician called daily for about ten days and then came only when called.

AFTER QUARANTINE

According to Sister Kenny's recommendations,[3] upon lifting quarantine the routine bath is permitted. The patient seemed no worse for the venture and the mother expressed amusement that her "roughneck" had enjoyed a bath. The Visiting Nurse discontinued calls now and the technician and the mother carried on, with daily packs, tendon stimulation and muscle reeducation. The mother once again assumed her housekeeping responsibilities. The kitchen table was used for giving treatments.

RETURN TO HEALTH

One month and a half after onset the only muscle still completely alienated was the gluteus maximus on the right; the medius and minimus were aware and active. All muscles were receiving daily exercises or stimulation according to the Kenny concept. The right upper trapezius frequently had recurrence of incoordination and there was weakness in the tibialis anticus on the left and both quadriceps. However, at this time the patient was helped to his feet. He was supported by his mother and the technician and then put back to bed. This was repeated three days in succession and in the process it was noticed that the alienated gluteus maximus contracted apparently by reflex during this process. On the fourth day standing was included in the daily exercises.

Because of the daily exercise and the standing the child had not forgotten how to walk[4], and sixty days after onset the patient was asked to walk from the technician to the mother. He did this well, in four rather weak but perfectly executed steps. However, he showed a tendency to walk on his toes so was not given walking as a daily exercise. Hot packs were increased over the gastrocnemii for three days and this tendency was overcome, so that then daily walking was begun.

Now he began taking his noon meals with the family, being carried to the table by his father. He still was not allowed bathroom privileges since his walking was done only under supervision. Thanksgiving Day the patient was able to go with his family to his grandfathers for dinner. Although he was not allowed to walk he had a perfect day with aunts and cousins and his "grandpop" making him the center of entertainment.

Daily packs and treatment continued and walking was helping the gluteus begin to respond to the pinching contraction during his table exercises. It was during the third month that this took place and the child was given bathroom privileges and allowed to walk back and forth to meals from his room. There was some recurrence of spasm in the medial head of gastrocnemius on the left and the biceps femoris bilaterally, and when this occurred the mother was instructed to omit all other packs and concentrate ten minute packs on these for an hour daily. This was necessary for two days only.

The second semester of school began six months after the onset and the physician felt that the patient was ready and able to go. He was to avoid stair climbing as much as possible but he was able to execute steps perfectly. Weakness was general, but marked in the quadriceps bilaterally and the left tibialis anticus. Analysis showed some spasm still present in the abdominals and right gluteus maximus but he walked perfectly. Half days at school were followed by half day packing hourly and rest in bed, and the patient was rapidly returning to normal.

CONCLUSION

This case was one of three carried by the technician along with morning and afternoon hospital hours plus six other private patients. From the viewpoint of the technician the work can be carried along with a busy schedule. To the Public Health Nurse it was just another case.

From the viewpoint of the mother, it can be carried along with a busy household without household help. The mother was worried, and upset and the added burden was a welcome occupation to fill that need to "do something." Also the mother's mind was relieved as she watched her child daily returning to health. Financial worries were reduced to nothing.

From the viewpoint of the child—he was interested, happy, comfortable and easy to entertain. The bedroom usually was a museum of toys, airplane models and other childhood interests, but housekeeping order was put into the background.

In conclusion, Kenny technic for treatment of acute poliomyelitis is adaptable to the home. With nurses and physicians and technicians scarce in a wartime world and with hospitals overcrowded it would seem wise to keep many cases, which are not dangerously ill, at home. Young, strong, intelligent parents and a willing technician working under the supervision of an understanding physician can use Kenny technic to the advantage of all concerned.

REFERENCES

1. Kenny, Sister Elizabeth: Treatment of Infantile Paralysis in the Acute Stage, Chap. IV, p. 57. Bruce Publishing Co., 1941.
2. Ibid. Chapt. III, p. 48, 49 and 53.
3. Ibid. Chapt. V, p. 81.
4. Ibid. Chapt. IV, p. 57; Chapt. V, p. 89; Chapt. VI, p. 98.

The Use of Splints and Braces

(*Part II—Conclusion*)

C. L. Lowman, M.D.

A few simple rules of splintage which every medical student as well as practitioner should know, are as follows:

I. *Joint Control*: A joint cannot be completely immobilized unless *at least* the contiguous joints above and below are controlled. For partial control for an ankle joint, apparatus to the calf may be all that is required. But for total control or immobilization (as needed for postoperative foot cases, ankle disease, or low leg fractures) cast or apparatus should go above the knee, with the knee slightly bent. This slacks off the achilles and prevents rotation deviation. Lack of attention to rotation is perhaps the most common oversight in the treatment of the early or acute stage.

If total control of a knee is desired, both foot and hip joint must be included for simple retention and rest; to control flexion and extension only, the pelvis may be left out and the foot included. A cross bar placed in the cast under the heel may control rotation, or, when splints are to be used in bed suspension from the Balkan frame, or support by means of sandbags or special attachments may give enough control. Remember, however, that no knee is wholly immobile, even when a cast or splint covers the thigh tightly clear to the groin. The muscle mass is too great, and skeletal fixation cannot be obtained in this manner. Similarly, unless the foot is included, the weight of the foot will rotate the tibia and produce movement or malalignment at the knee.

Control of hip joints requires that both knee and pelvis be included. Knees should be bent at an angle unless the foot is included; otherwise, rotatory movement will not be controlled. Even the single spica cast or brace will not give absolute immobilization, as no band or cast around the thick buttock will stop the pelvic segment from moving or shifting alignment. Only by including the opposite hip joint can absolute fixation be obtained.

The spine may be nominally controlled for alignment, and anterior posterior and lateral movement obtained by cast or jacket from axilla to pelvis in its lumbodorsal area. Upper dorsal in anterior posterior plane, and lumbosacral in lateral and anterior posterior planes will not be wholly controlled, nor will sacroiliac fixation be accomplished in this way. For the latter, at least one hip joint must be included with the thigh, thus locking the pelvis.

For absolute fixation in upper dorsal conditions such as Pott's disease or fractures, shoulders, chin and occiput mut be included in cast or brace. This fixation is all that is necessary for most cervical involvements, but to control rotation, brace or cast must encase the head as well. Remember that "the spine's a wavy bone," and that its segments compensate in position; therefore, to control one end completely the whole must be controlled.

The same reasoning applies to the arm and shoulder. A full shoulder spica cast that does not include the elbow will not wholly fix the joint, but it may be all that is required if abduction only is to be controlled. For the same reason, fractures of humerus or elbow region often require that the shoulder joint also be fixed.

In the forearm and hand, the elbow and wrist likewise must be fixed if pronation and supination, with their effect on the wrist joint, are to be avoided.

II. *Control of Alignment*: The control of alignment as well as motion which requires control of three planes—anterior posterior, lateral and rotatory have been sufficiently discussed in the above paragraphs.

III. *Pressure and Counterpressure*: Pressure and counterpressure must be opposite and equal. All types of apparatus (even when properly fitted) must make some pressure. The amount of force varies from the simple resistance of a retention splint to the weight of the part, to the extensive amount of force necessary in

Read in abbreviated form before the Western Orthopaedic Society, Nov. 21, 1942.
2417 South Hope St., Los Angeles, Calif.

controlling malalignment, and the deviations due to muscle spasm.

When pressure on one point is not neutralized by equally distributed opposite pressure, faulty control results, and proper alignment is not obtained. Discomfort and pain result, and pressure sores occur over certain points if pressure is not equalized or properly distributed. Many surgeons skilled in plastic technic prefer the use of plaster because of this wide distribution of pressure. But unskilled application of casts will produce disastrous and embarrassing results, and bad results are frequent enough to account for the marked distrust of plaster prevalent in many lay minds. Regardless of the amount of skill at hand, frequent inspection and constant vigilance should be made to prevent untoward results.

Both local and general circulation of the parts enclosed must be assured, and it should be remembered that even though the cast was originally applied with skill and accuracy, swelling within the splint or cast may interfere with circulation. This danger is so general that many surgeons cut a slot through all casts just after they have become sufficiently solid—to allow quick release by springing the cast a little open, and also to avoid criticism should any complication arise.

IV. *Protection of Bony Prominences*: All bony prominences should be protected by correctly adjusted pads, to avoid pain, discomfort or pressure sores. For example, a thick, soft, flat pad should be placed back of the ankle to protect the heel by distributing some of the pressure to the region of the tendo achilles and the lower calf area. The prominence of the head of the fibula also should be watched to keep pressure from the popliteal nerve which winds around it. Anterior and posterior spines of the ilia at the tips of posterior processes of the vertebrae must be protected similarly. Slotted felt pads are suitable for these points. Inner condyles of elbows and the distal ends of radius and ulna also must be remembered.

V. *Bandaging*: To prevent swelling of distal areas, bandaging for maintenance of splints should be smooth and applied with uniform pressure. When extremities are bound in splints by bandages it is best to use flannel, stockinette or linen mesh types so that the contours may be followed readily. Uniform tension must be made on the turns, and broad enough bandage used to prevent constriction by edges or folds which might endanger circulation.

VI. *Size and Shape of Splints*: To be effective splints should be of proper size and shape. Ill-fitting splints are almost sure to work loose and become uncomfortable if not actually harmful. Properly fitting splints require less pressure from bandages to keep them in place.

VII. *Area Splinted*: The area splinted, braced or immobilized depends upon the character of disease, pain, muscle spasm, age, strength, size and temperament of the patient. An obstreperous boy requires a greater area of fixation than does a cooperative adult. Due to their tender skin, babies and old people do not tolerate casts and splints well. The babe's continuous wriggling and soiling of apparatus or cast constitute special problems. Similarly, the less active circulation in the skin of the aged, especially over bony prominences, must be watched closely, and mental depression discounted or allowed for. Aged victims of fracture of the neck of the femur should not be treated by too much or too long splinting while their organic and mental state have little consideration. Often the treatment of the fracture must be sacrificed to the larger problem of saving the patient.

Time of application and duration are to be considered together.

All injuries usually are splinted at once unless swelling, circulatory impairment or lacerated or infected wounds complicate matters and cause a delay. In compound fractures, for example, the injured member may simply be laid upon a pillow to be treated with fomentations, light therapy, etc., until danger of infection is overcome and the reduction of the fracture takes place.

Where vessels have been torn and there is danger of gangrene, all bandaging must wait. Even in such cases, a simple retention or rest splint may be advisable to facilitate handling, reduce pain, and control in some degree the alignment of fragments.

In acute diseases such as osteomyelitis, poliomyelitis, joint tuberculosis, acute synovitis from any cause, the best of judgment is needed as to when to splint. Orr of Lincoln, Nebraska, who has taught us much about acute and chronic osteomyelitis, advises early operation and the use of extensive casts covering large areas, with further rest in bed and infrequent dressings. For instance, he states that even a lesion of the foot or tibia requires a full spica of that leg and of the body in order to obtain absolutely complete immobilization and physiological rest.

Most surgeons are now agreed that some form of rest splints are indicated in the acute painful stage of poliomyelitis. But because these cases are seen first by the physician or neurologist, the

necessity of splinting is likely to be neglected, or treated lightly, especially in districts where there is lack of contact with those who fully understand the technic of handling these cases.

Due to the frequent obscurity of early symptoms in joint tuberculosis, many cases are allowed to drift along for weeks without control or splinting, permitting contraction deformities to become established so insidiously from protective spasm that much mischief is done before it is noted.

In certain joint injuries, sprains, strains, synovitis, etc., if splints are to be used, they usually are indicated at once. But in these cases even more than others, the necessity of understanding how long parts should remain in splints is vital. Too long often is worse than not long enough and no absolutely fixed time can be set. Organization of exudates and blood clots in a joint may lead to fibrosis, adhesions, or even ankylosis, if cast or splint is used for too long a period.

Sometimes splinting of a slightly involved joint confirms the idea of great injury in a patient's mind, making him helpless for a long period due to an hysterical anxiety complex. The proper sequence is to use ample dressings broadly and firmly bandaged, and a splint long and snug enough to give ample rest and firm fixation. This should be disturbed as little as possible under existing conditions, and after one or two weeks, when swelling has decreased or wound closed, should be removed for physical therapy theatments.

If cast is chosen for treatment it may serve its maximum purpose in the first two weeks, and then it may be split, and one half (usually the posterior or under-portion) used longer as a rest splint. The part may then be removed for physical therapy treatment and surgical inspection. This portion of cast should be discontinued as early as possible, and supporting pads and some form of elastic (not rubber) bandage substituted.

The character of fixation may be partial or complete, or complete for one joint and partial for another. During or following the acute stage of injury or disease, complete immobilization of the bone or joint involved, including the whole limb, usually is indicated. For a long bone, it should include at least the joint at either end, and for a joint, it should include both the adjacent joints.

Occasionally, when skeletal traction is used to overcome spasm and maintain alignment, a splint hinged to allow motion is used. For instance, in femur fractures, the modified Thomas, which has a movable segment to support foot and leg, but allows movement at knee, is of value.

Instances of partial and complete fixation might be complete cast of leg and thigh, hinged to allow hip joint movement in anterior posterior plane, or a spica cast of pelvis and leg. Or in complete fixing effect to hip joint or fracture of femoral neck, the anterior half of cast may be removed to allow exercise. If cast is put on with knee semiflexed to control rotation, some motion can be given to the knee during physical therapy treatment of ankle and foot.

Frequently, in bracing tuberculous knees or hips, these joints are held completely immobile, with the ankle left free, or at least given a joint in the brace to allow some degree of anterior posterior movement. Thus, rotation and lateral deviations of the foot are prevented, but enough ankle action is allowed in anterior posterior plane to keep up the muscle tone and nutrition of the foot.

Certain splints for the shoulder joint and humerus (such as the modified aeroplane or the Jones traction ring splint, flexed at 90° at elbow) control upper arm and shoulder joint but allow pronation-supination movements of forearm and wrist, and finger movements.

Changes of splinting are often indicated in specific and progressive manner to fit in with various forms of physical therapy treatments. The surgeon who obtains the quickest results with the safest handling, and does not forget the psychological benefits of apparent progress in the lengthy cases, is the one who appreciates and uses proper sequence of splinting.

The progressive modification of the plaster cast by cutting windows, shortening or removing certain portions to allow hygienic cleansing, massage and beginning exercise, will stimulate the patient, let him see what is being done for his comfort and progress. Later, when the cast is bivalved, massage and light, or electricity may be applied to the exposed area. Next, the part may be taken from the cast for more extensive treatments such as diathermia, hot and cold fomentations, more massage, and then returned to the half cast, or changed onto a comfortable splint.

When the active phase permitting corrective gymnastics has been reached, a shift may be made into some form of ambulatory splint or brace, with or without the aid of crutches. The brace action may be slight at first, and as pain and spasm subside, muscles become stronger or bone repair sufficient, joint stops may be released from one joint after another until the fullest function is obtained and the brace can be discarded or modified to the minimum requirement of the case.

Need for Physical Therapy Technicians

John S. Coulter, M.D., and Howard A. Carter, B.S. in M.E.

Physical therapy has proved a necessary adjunct to medical and surgical treatment in the rehabilitation of injured persons. Physical therapy should be prescribed by a physician and administered by a trained physical therapy technician under medical supervision. War has created a shortage of these technicians. It seems advisable, therefore, to make an estimate of the need during this national emergency for physical therapy technicians in the Army General Hospitals, civilian hospitals, crippled children's schools and the Children's Bureau, United States Department of Labor.

The Surgeon General of the Army in August 1940 stated that the Army was "very anxious to make adequate preparation for physical and occupational therapy in Army Hospitals." In September 1940 one of us (J. S. C.)[1] published an estimate of the number of physical therapy technicians which the army would require if the United States became engaged in war. This article stated:

> In any event an estimate of 300 general hospitals of 1,000 beds each for six field armies in a war of such severity as is occurring in Europe would not seem to be excessive.

This estimate was approved by the Surgeon General of the Army. A general hospital of one thousand beds is authorized to employ 7 physical therapy technicians. This means that in this war the army would require 2,100 physical therapy technicians when it reaches its full strength. The Surgeon General of the Army estimates that 778 physical therapy technicians will be needed up to Dec. 31, 1942.

In physical therapy departments in civilian hospitals the shortage is also acute. For instance, one large Chicago hospital has 2 registered physical therapy technicians, 1 practically trained physical therapy technician and 1 nurse. Apparently it has been absolutely impossible to replace the last-named 2 persons with registered physical therapy technicians, as this hospital would like to do. Similar situations prevail in many other hospitals.

In order to determine the civilian hospital needs for physical therapy technicians we made a study of the need for physical therapy technicians in civilian hospitals which have an average census of over 150 and which are registered by the Council on Medical Education and Hospitals of the American Medical Association.

It is realized that a "need" for these technicians is not necessarily the same as a "demand." The demand is governed largely by economic factors. It is determined by the price and the availability of the service rendered. The need for these technicians is a medical, not an economic, concept. It is not always a conscious need; the ordinary layman lacks the knowledge to define his own medical needs, and physicians in some localities regard physical therapy as a luxury, doubting that the benefits justify the expense, especially for patients of moderate means.

We agree with the statement of Lee and Jones[2] in their comments on the uses and limitations of their report on good medical care. They stated:

> No judgment is offered in this report with regard to the immediate possibility of making a general application of good current medical practice to the needs of all the people. Even apart from the serious limitations imposed by economic considerations, it may be that we cannot achieve adequate medical care in our imperfect human society. The practice of medicine cannot rise far above the cultural level of the population it serves. "Public Health is purchasable," but the purchase involves a desire to purchase, the willingness as well as the ability to pay for it, and at least some understanding of what is being bought.

To estimate the need of physical therapy technicians in civilian hospitals with an average census of over 150 the following method was used: Fifty hospitals in different areas of the United States with an average census of over 150 were chosen which had good physical therapy departments (table). The ratio of the total

Reprinted with permission from War Medicine, Sept. 1942, Vol. 2, pp. 824-829. Copyright 1942, by American Medical Association.

122 South Michigan Boulevard.
535 North Dearborn Street.

number of physical therapy technicians employed in these hospitals to the total average census of these fifty hospitals was applied to all hospitals in the United States having an average census of over 150. It was estimated by this method that a total of 1,584 physical therapy technicians was needed in these civilian hospitals.

For the country as a whole we believe a supply of physical therapy technicians in excess of the number shown in our estimates is needed for civilian hospitals. Our estimates include only hospitals with an average census of over 150, but actually many hospitals with an average census much less than this have a need and a demand for physical therapy technicians. For instance, one hospital in Illinois with an average census of 88 employs 3 physical therapy technicians.

In determining an estimate of the number of physical therapy technicians for crippled children's schools we secured from the United States Office of Education, Federal Security Agency, Washington, D. C., its bulletin[3] giving the number of crippled children enrolled in special schools in city educational systems in 1937-1938. The total number of crippled children in these schools was 25,236.

Sever[4] recently stated that physical therapy is a fundamental necessity in schools for crippled children and should go hand in hand with academic training. He also asserted:

> In general, there are too many cases of all types assigned to each physical therapist, the average running from 10 to 98. Ten to fifteen cases to treat a day is enough, and ten is plenty, especially if there is no trained help to remove and reapply braces and other apparatus.

Fifty Hospitals Having Good Physical Therapy Departments

Number of Hospitals	Average Census	Total Number of Technicians
	California	
1	213	4
2	153	1
3	199	2
4	160	2
5	150	3
	Colorado	
6	164	1
7	162	1
8	193	2
	Illinois	
9	335	4
10	153	3
11	160	2
12	455	7
13	305	2
14	410	3
15	207	2
	Michigan	
16	186	1
17	178	1
	Minnesota	
18	481	3
19	368	2
20	216	6
	New Jersey	
21	170	3
22	180	2
23	230	2
24	191	2
25	181	3
26	163	1
27	211	2
	New York	
28	207	4
29	173	9
30	196	2
31	183	3
32	647	7
33	270	4
34	381	3
	Ohio	
35	151	1
36	373	3
37	165	1
38	153	1
39	1,217	6
40	196	3
41	280	3
42	248	2
43	348	3
44	192	3
	Rhode Island	
45	358	8
	Virginia	
46	409	2
47	278	4
	West Virginia	
48	213	1
	Wisconsin	
49	669	5
50	224	2
Total	13,705	147

Applying Sever's high estimate of 15 children to 1 physical therapy technician, 25,236 crippled children in schools will need 1,682 physical therapy technicians.

When estimating the number of physical therapy technicians required in the United States in order to meet the needs of the services for crippled children we wrote the Children's Bureau, United States Department of Labor. This bureau replied:

> After reviewing the provisions made in the various state plans, we believe that the Maryland program, with respect to the physical therapy services, would probably be considered as the best plan submitted by any State agency inasmuch as it provides adequate field services by qualified physical therapy technicians as well as excellent physical therapy services within hospitals and institutions used for the care of crippled children. The number of physical therapy technicians referred to above as being employed under the State program covers only the number on the field staff and does not include any of those who may be employed in hospitals or institutions in Baltimore.

In Maryland for a registered number of 3,031 crippled children 7 physical therapy technicians are employed under the crippled children's program. It is believed that we can again make an estimate of the total number of physical therapy technicians needed for this program. The ratio of the number of physical therapy technicans employed in Maryland's crippled children's program to the number of crippled children in Maryland was applied to the total number of registered crippled children reported on state registers June 30, 1941 (307,478). It was estimated by this method that 710 physical therapy technicians were needed for this work. It is to be remembered that the physical therapy technicians employed in the Children's Bureau are for field service and are not for service in hospitals or in crippled children's schools.

Our estimate now shows the following totals:

United States Army General Hospitals	2,100
Civilian hospitals	1,584
Crippled children's schools	1,682
Children's Bureau, United States Department of Labor	710
Total	6,076

We realize the limitations of this study. The quantitative estimates of the need as given cannot be regarded as an immediate practical objective or as a rigid standard by which to judge the adequacy of local medical facilities. They are estimates computed for a standard community. We believe that if patients in the fifty listed civilian hospitals received the care given in hospitals by their physical therapy departments, other communities are entitled to the same care. We believe that the general interpretation of this study is a reasonable one: that the estimates given are valuable for a community planning adequate medical care and that these estimates must be taken into consideration in the problem of training an adequate number of physical therapy technicians.

Perrott and Dorn[5] in a study of the imminent needs for hospital personnel in registered private and nonfederal governmental hospitals found that there were 110 physical therapy technicians needed to fill vacant positions for which funds are available and 137 to fill positions which will be created by the expansion of present facilities.

The Subcommittee on Physical Therapy of the National Research Council in a recent survey found the following demand for physical therapy technicians in the immediate future:

Bureau of Medicine and Surgery, United States Navy	0
United States Public Health Service	14
United States Veterans' Administration	70
Civilians (Perrott and Dorn[5])	292
United States Army Medical Corps	778
Demand total	1,154

If the estimates in this list of demands are correct, we believe that it is imperative to institute a broad program to encourage qualified persons to train as physical therapy technicians. The scholastic requirements for admission to a school for physical therapy technicians approved by the Council on Medical Education and Hospitals of the American Medical Association are (*a*) two years or sixty semester hours of college, including courses in physics and biology; (*b*) graduation from an accredited school of physical education, or (*c*) graduation from an accredited school of nursing. Most of the students for the courses for physical therapy technicians will have to come from the group of college students because there is an even greater shortage of nurses and the graduates of courses in physical education are in great demand for recreational services.

Two methods are being used now to overcome the immediate shortage of physical therapy technicians. First, the United States Office of Civilian Defense in its bulletin "Volunteers in Health, Medical Care and Nursing" is providing for the training of volunteer physical therapy assistants. These assistants are to aid trained tech-

nicians but are not to assume any independent responsibilities for therapeutic procedures.

It is hoped that some trained physical therapy technicians who are assistants in large physical therapy departments of civilian hospitals will be relieved for services elsewhere by the use of these volunteer physical therapy assistants.

A second method to overcome this shortage is to increase the number of students in approved physical therapy courses by an educational campaign in colleges. The National Society for Crippled Children, Inc., is aiding this campaign by distributing to every college in the country a poster "The Nation Needs Physical Therapists."

After World War II there will be a greater need for physical therapy technicians for the rehabilitation of injured persons. Hence, now is the time to prepare for that emergency by seeing to it that facilities are made available to provide trained personnel to meet the need.

REFERENCES

1 Coulter, J. S.: Physical Therapy in the Military Service, J. A. M. A. 115:864 (Sept. 7) 1940.

2. Lee, R. I., and Jones, L. W.: The Fundamentals of Good Medical Care, Chicago, University of Chicago Press, 1935.

3. Statistics of Special Schools and Classes for Exceptional Children, in Biennial Survey of Education in United States Bulletin 1,940, No. 2, Federal Security Agency, Office of Education, 1940, Chap. 3, pp. 337-358.

4. Sever, J. W.: Physiotherapy in Schools for Crippled Children, Physiotherapy Rev. 18:298 (Nov.-Dec.) 1938.

5. Perrott, G. St. J., and Dorn, H. F.: Imminent Needs for Hospital Personnel, Hospitals 16:46 (March) 1942.

Exhibits Available

1. "Reproductions of the Pictures on the History of Physical Therapy":
   8 posters, 22x28 inches, containing 19 reproductions of pictures on hydrotherapy, electrotherapy, massage, exercise, etc., from the earliest times. Posters will be shipped in frames ready for hanging. Weight when packed for shipping 60 pounds.

2. A motion picture film 200 feet long, on "Massage." (16 mm.)

3. "Posture Plays an Important Part in the Physical Therapy of Bed and Convalescent Patients":
   6 posters, 22x28 inches, in frames with photographs showing: good and bad posture of a patient in bed; good and poor posture in a wheel chair; instruction in walking with crutches and with a "walker." Weight when packed for shipping approximately 60 pounds.

4. "Statistical Map" showing schools approved by the American Medical Association, location of American Physiotherapy Association Chapters, Membership, etc. Weight when packed for shipping 46 pounds. This is in pastel colors. Should be displayed on an easel as it is too heavy to hang. Size 45x35 inches.

5. Poster 22x28 on the American Physiotherapy Association. "Requirements for Membership, Curriculum Content, Scope, Membership and Chapter Growth."

6. A motion picture film (16 mm.) "The Maintenance of Neutral Position of Patients with Infantile Paralysis During Nursing Care in the Hospital and in the Home."

7. Poster showing publications of the American Physiotherapy Association individually mounted (with request slips).

8. Poster: "The Nation Needs Physical Therapists."

9. Poster on pool construction and design.

For information regarding these exhibits, write Dorothy Dean, Exhibits Chairman, 33 E. Division Street, Chicago, Ill.

Schools Approved for Training Physical Therapy Technicians

By the Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements *	Duration: Regular Course	Duration: Emergency Course	Time of Admission: Regular Course	Time of Admission: Emergency Course	Tuition**	Certificate Diploma Degree **
Children's Hospital, Los Angeles	Steele F. Stewart, M.D.	Miss Lily H. Graham	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.	6 mos.[1]	Feb. and Sept.	Feb. and Sept.	$200 R $200 E	Diploma R Certificate E
Stanford University, Stanford University, Calif.	William H. Northway, M. D.	Miss Catherine Worthingham, A.B., M.A.	(a) R. N. (b) Phys. educ. major (c) 3 yrs. coll.	12 mos.[1]	7 mos.[1]	Jan. and June	Jan., Mar. June and Sept.	$429 R $286 E	Certificate or B. A.
Walter Reed General Hospital, Washington, D. C.	B. A. Strickland, Jr. Capt., M. C.	Miss Emma E. Vogel	Phys. educ. major	.....	6 mos.	.....	Quarterly	None	Certificate
Northwestern University Medical School, Chicago	John S. Coulter, M. D.	Miss Gertrude Beard, R.N.	(a) R. N. (b) Phys. educ. major (3) 3 yrs. coll.	9 mos.[1]	6 mos.[1]	Oct.	Jan. and July	$200 R $200 E	Certificate
Bouve'-Boston School of Physical Education, Boston	Arthur L. Watkins, M.D.	Miss Constance K. Greene	High sch. grad.	3 yrs. 4 yrs.[3]	6 mos.	Sept.	Aug.	$400 yr.	Diploma or B. S.
Harvard Medical School, Boston	Frank R. Ober, M.D.	Miss Janet B. Merrill	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.[2]	9 mos.	6 mos.[1]	Sept. and March	Sept. and March	$200 R $200 E	Certificate
Boston University, Sargent College of Physical Education, Cambridge, Mass.	Louis Howard, M.D.	Mrs. Lucille W. Fuller	2 yrs. coll.	2 yrs.	[4]	Oct.	[4]	$547	Certificate and B S.
University of Minnesota, Minneapolis	M. E. Knapp, M.D.	Miss Sara E. Kollman, R.N.	(a) R. N. (b) Phys. educ. major (c) Medical technology grad. with B.S. degree	12 mos.[1]	.....	June and Sept.	.....	Univ. fees	Certificate
Mayo Clinic, Rochester, Minn.	Frank H. Krusen, M.D.	Mr. Carl O. Moe, R.N.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	.....	6 mos.[1]	.....	Jan. and July	None	Certificate
St. Louis University School of Nursing, St. Louis	Alexander J. Kotkis, M.D.	Sister M. Consella, R.N.	High sch. grad.	4 yrs.[1]	.....	Jan. and Sept.	.....	$250 yr.	B. S.
University of Buffalo School of Nursing, Buffalo	George G. Martin, M.D.	Miss Edna Beaver, R.N.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.[1]	6 mos.[1]	Feb. and Sept.	Feb. and Sept.	$425 R $375 E	Certificate
Hospital for Special Surgery, New York City	Kristian G. Hansson, M.D.	Miss Ethel M. Willmer	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.[1]	6 mos.[1]	Sept.	Sept.	$300 R $200 E	Diploma
D. T. Watson School of Physiotherapy, Leetsdale, Pa.	Jessie Wright, M.D.	Miss Dorothy Lovdahl	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.[5]	2 yrs.[1]	6 mos.[1]	Sept.	Jan. and July	None R $200 E	Diploma R Certificate E
Richmond Professional Institute of the College of William and Mary, Richmond, Va.	Thomas W. Wheeldon, M.D.	Miss Alice Jones	(a) R. N, (b) Phys. educ. major (c) Coll. grad. (d) High sch. grad.	9 mos. 4 yrs.	....	Feb. and Sept.	.....	Coll. fees	Certificate or B. S.
University of Wisconsin Medical School, Madison	Ernst A. Pohle, M.D.	Miss Margaret Kohli, B.S.	(a) R. N. (b) Phys. educ. major	12 mos.[1]	6 mos.	Feb. and Sept.	Feb. and Sept.	Univ. fees	Certificate

Name and Location of School	Medical Director	Technical Director	Entrance Requirements	Duration		Time of Admission	Tuition	Certificate Diploma Degree
				Regular	Emerg.			
College of Medical Evangelists, Los Angeles	Fred B. Moor, M.D.	Albert H. Carlson	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.	.....	Jan. and July	$ 225	Certificate
Barnes Hospital, St. Louis	Frank H. Ewerhardt, M.D.	Beatrice F. Schulz	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.	6 mos.	Oct.	$200	Certificate
New York University, New York City	William Bierman, M.D.	G. G. Deaver, M. D.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.	.....	Sept.	$396	Certificate, B. S. or M. S.
University of California Hospital, San Francisco	Frances Baker, M. D.	Mrs. Margery Wagner	(a) R. N. (b) Phys. educ. major (c) Coll. grad.	12 mos.	.....	Oct.	$150	Certificate
University of Iowa, College of Medicine, Iowa City	W. D. Paul, M. D.	Mrs. Olive Farr	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	.....	6 mos.	Mar. and Sept.	None	Certificate
Cleveland Clinic Foundation Hospital, Cleveland, Ohio	Walter J. Zeiter, M. D.	Anna Wetterhuus, R.N.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.	.....	July	None	Certificate
Graduate Hospital, University of Pennsylvania	Wm. T. Johnson, M. D.	Samuel Henshaw	(a) R. N. (b) 2 yrs. coll.	12 months	.....	Sept.	$200	Certificate

* Courses are so arranged that any of the entrance requirements (a, b, c or d) will qualify students for training.

** R = Regular course; E = Emergency course.

1. Male students are admitted.
2. Four year course leads to B. S. degree from Simmons College.
3. This group admitted to emergency course only.
4. Emergency course offered in cooperation with Harvard Medical School.
5. Only those with three years of college are admitted to emergency course.

Reprints

"Physical Therapy as a Vocation"

"Approved Schools of Physical Therapy"

"Training of Physical Therapy Technicians"

The Constitution of the American Physiotherapy Association

Code of Ethics and Discipline of the American Physiotherapy Association

The Blue Booklet, "The American Physiotherapy Association is Organized to Serve"

"What Does a Physical Therapy Department Contribute to a Hospital?"

"A Study of Physical Therapy Costs in Industrial Medicine"

"Role of the Physical Therapist in the Care of the Crippled Child"

"Ethics and the Physical Therapy Technician"

"Bulletin of Information, American Physiotherapy Association"

List of National and Chapter Officers of the American Physiotherapy Association

To obtain any or all of these reprints, address Miss Hazel E. Furscott, Chairman, Relations Committee, 219 Fitzhugh Building, San Francisco, California. Single reprints, 10c; complete set of reprints, 25c. Free to nonmembers.

The
Physiotherapy Review

Editor-in-Chief: MILDRED ELSON

Business Manager: HAZEL PUTMAN

Associate Editors

GERTRUDE BEARD

BESS SEARLS

The Physiotherapy Review is published bi-monthly by The American Physiotherapy Association

Editorial and Business Office,

737 N. Michigan Ave., Chicago

VOL. 23 *May-June* No. 3

Planning for Postwar Medical Services

In the May 1st issue of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION appear several papers which were read at the National Conference on Planning for War and Postwar Medical Services which was held in New York City on March 15, 1943. We recommend that you get a copy of this JOURNAL and read the articles, particularly the one on "American Medicine's Contribution to Postwar Medical Service" by Morris Fishbein, M. D. In this article he states that the statesmen who are concerned primarily with the economic rehabilitation of the war-torn world have recognized the vital character of medicine's contribution. He quotes the Hon. John G. Winant, our ambassador to the Court of St. James, who said:

"When war is done, the drive for tanks must become a drive for houses. The drive for food to prevent the enemy from starving us must become a drive for food to satisfy the needs of all people in all countries. The drive for physical fitness in the forces must become a drive for bringing death and sickness rates in the whole population down to the lowest possible level. The drive for manpower in war must become a drive for employment to make freedom from want a living reality."

The ideals of this platform, Fishbein goes on, merit the support of everyone who loves his fellowman. Since the American Physiotherapy Association has recognized this problem and has taken active steps toward rehabilitation, this platform has our unanimous endorsement. We realize from the experiences following World War I that adequate planning for the wounded and for their rehabilitation into civilian life must be done. It should be of great importance to have this problem so well understood by the medical profession. We are very fortunate in being closely associated with such a fine group, and we want them to know that they will have all possible support from us as technicians.

The schools of physical therapy have consistently maintained a high standard in spite of accelerated schedules. Fishbein brought out that this was true also of the medical schools and that the high standard would be continued. The need after the war for highly trained, intelligent, socially-minded technicians will be greater than ever before. The demands for service will be increased for it will be necessary for many girls to remain in service as physical rehabilitation does not take place in a day or a week following the termination of the war.

Fishbein points out the time is not too soon for us to establish the necessary organizations for the control of medical rehabilitation and reconstruction. He is not talking in terms of this country alone, but of the world, because isolation is a thing of the past and medical rehabilitation knows no boundaries. He states: "American medicine recognizes its obligation. . . . We shall study those problems; we shall plan; we will meet the obligation inherent on us to provide our people with the quality of medical service that has given us the lowest sickness and death rates in the world." He further states that no greater task has ever confronted the physicians of America than the part they will be asked to play in the planning of medical services for the postwar world. We think the same is true of the physical therapy technicians, and we know that they will anticipate and meet the problems which will be our part of the total rehabilitation picture.

A manual on "Orthopedic Conditions at Birth: Nursing Responsibilities" by Jessie L. Stevenson, R.N., Consultant in Orthopedic Nursing, National Organization for Public Health Nursing, is now available. This manual may be obtained without charge by writing to the Joint Orthopedic Nursing Advisory Service of the National Organization for Public Health Nursing, and the National League of Nursing Education, 1790 Broadway, New York, N. Y.

Army and Navy Commissions

No further word has been received concerning army and navy commissions. We are therefore reprinting the material published in the March-April 1943 issue.

Application for Army Commission—A recent letter received from the War Department, Services of Supply of The Surgeon General, Washington, D. C., reads as follows:

"In accordance with Public Law 828—77th Congress, dated December 22, 1942, a military status is authorized for female Physical Therapy Aides in the Medical Department of the Army for the duration of the war and six months thereafter. Original appointments are made in the grade of Physical Therapy Aide with the relative rank of Second Lieutenant; salary $1800 per annum plus quarters and subsistence allowances.

"An applicant must be a citizen of the United States who meets the educational requirements and who will not have passed her 45th birthday at the time of appointment. A physical examination by a Board of Medical Officers is required.

"If you are interested in accepting an appointment for an assignment wherever needed, please complete the attached form in duplicate and return to this office as soon as practicable. It is requested that evidence of completion of the courses referred to in question 21 accompany your application. The permanent address given will be the one from which travel will be issued and the one to which you will be returned after your tour of duty is completed. Kindly state the date you will be available for appointment.

"Appointments to this position are made in the Office of The Surgeon General.

Very truly yours,
Emma E. Vogel,
Major, A. U. S.,
Director of Physical Therapy Aides."

(Note: The application blanks referred to may be obtained by communicating with the Office of The Surgeon General, Washington, D. C.

Navy Commissions—We have been informed that graduates of approved schools of physical therapy with A.B. degrees are eligible to be commissioned as ensigns in the WAVES. If you have six years' physical therapy experience in addition to the above qualifications, you are eligible to be commissioned lieutenant (junior grade).

The need for physical therapists to serve in the Navy is great, as is also the demand for personnel in the Army.

Uniforms

New uniforms for the army nurse corps, physical therapy aides and dietitians are to be issued by July 1, we hear, and all will be the same. Four types of uniforms are to issued: street, hospital (white poplin for wear in this country, and brown and white seersucker for overseas), and the olive drab herringbone work suit.

Ohio Chapter

The Ohio Chapter of the American Physiotherapy Association held its annual spring meeting at Neil House, Columbus, Ohio, on April 28 and 29, 1943. The program was as follows:

Wednesday, April 28th

9:00—10.30 A.M.	Executive Committee Meeting.
9:00—11:00 A.M.	—Registration.
11:30— 1:20 P.M.	Business Meeting and Luncheon (Members Only) Presiding, Mrs. Mary Deatherage, President, Ohio Chapter.
1:30— 3:30 P.M.	Miss Esther Gilman, Presiding. "Body Mechanics in Relation to Health"—David E. Jones, M.D., Director, Department of Physical Medicine, Ohio State University.
3:30— 5:00 P.M.	General Meeting with Ohio Hospital Association. Mr. James A. Hamilton, Superintendent, New Haven General Hospital, New Haven, Conn., President, American Hospital Association.
7:00 P. M.	Banquet with Ohio Hospital Association.

Thursday, April 29th

9:30—12:00 Noon	"Rehabilitation of War Injuries"—Harlan Wilson, M. D. "Speech Rehabilitation"—Marie Mason, Ph. D., Assistant Professor Speech and Visual Hearing, Ohio State University. "Occupational Therapy with Physical Therapy"—Jane Meyers, Occupational Therapy Department, Miami Valley Hospital, Dayton, Ohio.

Elliott G. Brackett, M. D., editor of the Journal of Bone and Joint Surgery for twenty years, died on December 29, 1942, at the age of 81.

A review course in "Muscle Anatomy and Physiology, and Treatment of Poliomyelitis in the Early Stage of the Disease" is being offered during May, June and July 1943, at the City Hospital, Cleveland, Ohio. This course is presented under the auspices of the Cuyahoga County Chapter of the National Foundation for Infantile Paralysis, Inc., and is directed by John A. Toomey, M. D., Professor of Clinical Pediatrics and Contagious Diseases, School of Medicine, Western Reserve University. The following subjects will be included in the course:

1. Mechanics and principles of levers.
2. Individual and antagonist muscle functions.
3. Physiology of muscles.
4. Recent physiologic experiments on muscles.
5. A criterion of recovery in disease.
6. Early methods of therapy.
7. Community resources.

Lectures will be given every Wednesday afternoon beginning May 5th, and practical exercises will be given in two week periods beginning July 19th.

Tri-State Hospital Assembly

The Fourteenth Annual Tri-State Hospital Assembly was held May 5 and 6, 1943, at the Palmer House in Chicago, Illinois. The conference of physical therapists sponsored by the Illinois, Indiana, Michigan and Wisconsin Chapters of the American Physiotherapy Association, was held on May 5th, with the following program:

IRENE L. ANDERSON, Chicago; Physical Therapist, Wesley Memorial Hospital; Chairman of the Physical Therapy Section, Tri-State Hospital Assembly, Presiding.

Greetings from the Tri-State Hospital Assembly
AMY BEERS, R.N., Muskegon; Superintendent, Hackley Hospital; Member, Executive Committee, Tri-State Hospital Assembly.

Treatment of War Injuries
(*a*) *Burns* (Illustrated)—EDWARD WATSON, M.D., Chicago; Cook County Hospital.
(*b*) *Treatment of Internal Derangement of Knees* (Illustrated)—DANIEL H. LEVINTHAL, M.D., Chicago; Assistant Professor of Orthopedic Surgery, University of Illinois College of Medicine.
(*c*) *Fractures*—WILLIAM R. CUBBINS, M.D., Chicago Professor of Surgery, Loyola University School of Medicine.
(*d*) *Rehabilitation*—JOHN S. COULTER, M.D., Chicago; Associate Professor and in Charge of Physical Therapy Department, Northwestern University; Regional Medical Officer, Sixth Civilian Defense Region.

The joint conference of occupational therapists and physical therapists, sponsored by the Illinois, Indiana, Michigan and Wisconsin Occupational Therapy Associations, and the Illinois, Indiana, Michigan and Wisconsin Chapters of the American Physiotherapy Association, was held on May 6th, with the following program:

ELIZABETH YORK, Milwaukee; Physical Therapist, Columbia Hospital, Presiding.

Greetings from the Tri-State Hospital Assembly—CHARLES A. LINDQUIST, Elgin; Superintendent, Sherman Hospital; President, Illinois Hospital Association.

Rehabilitation—The War and the Therapist:
The Growing Rôle of Hospital Therapists in Rehabilitation—V. J. SALLAK, New York City; Rehabilitation Assistant, National Tuberculosis Association.

Mental Aspects of Rehabilitation—MILTON C. BORMAN, M.D., Milwaukee; Instructor in Medicine, Marquette University School of Medicine.

Occupational Therapy in Rehabilitation—BELL GREVE, Cleveland; Executive Secretary, The Association for the Crippled and Disabled.

California Conference of Social Work

The California Conference of Social Work held a meeting at the Hotel Roosevelt in Los Angeles, California, on May 9 and 10. The program consisted of discussions on the "Rehabilitation of Handicapped Children and Disabled Ex-service Men and Women Workers and Civilians" and was arranged by the Pacific Zone American Society for the Hard of Hearing. This conference was important to various workers connected with different phases of rehabilitation of the disabled and was especially timely because the bill on rehabilitation of veterans has passed, and the legislation for the rehabilitation of civilians is pending.

Word has been received that physical therapy technicians Maxine Schuldt, Helen Maag and Gisella Wenzler, attached to Base Hospital No. 12, have been commissioned as second lieutenants. The girls report that they are enjoying their work very much, as well as having time for some interesting and different social experiences.

Correction

In the March-April 1943 issue, page 53, in the article on "Fractures of the Calcaneus" by Emil D. W. Hauser, M. D., the upper section of Figure 2 should have carried the following caption: "Reproduced from 'Diseases of the Foot,' by Emil D. W. Hauser, M. D., W. B. Saunders Company, Philadelphia, 1939."

Index to Current Literature

Allergy

Is the Hypersensitiveness to Chemical and Physical Agents Allergic in Nature? J. BRONFENBRENNER, Ph. D. J. Allergy, Jan. 1943.

Anterior Poliomyelitis

Symptoms and Diagnosis of Anterior Poliomyelitis in the Light of Recent Developments. WILLIAM BENHAM SNOW, M. D. Arch P. T., April 1943.

Apparatus

An Inexpensive Portable Fracture Table. HOWARD DUDGEON, JR., M. D., and BERNARD J. RIKE, M. D. J. Bone and J. Surg., April 1943.

A Splint for Cervical Fractures and Dislocations. PETER V. C. DINGMAN, M. D. J. Bone and J. Surg., April 1943.

Back Conditions

A New Approach to the Treatment of Scoliosis. R.S.-M.A.F. SMITH and A. Cpl. G. C. HACKWORTHY. J. Chart. Soc. M. & M. Gym., Mar. 1943.

Bone and Joint Injuries and Diseases

Avascular Necrosis of Bone. JAMES F. BRAILSFORD, M. D. J. Bone and J. Surg., April 1943.

Recurrent Dislocation of the Ulna at the Elbow. JOSEPH A. GOSMAN, M. D. J. Bone and J. Surg., April 1943.

The Physiologic Factors Involved in Protecting the Patient against Infection in the Healing of Fractures in Compound Wounds. H. WINNETT ORR. Trans. and Studies of the Coll. of Physicians of Phila., Feb. 1943.

Dermatology

Pityriasis Versicolor on the Face of an Infant. C. C. CARPENTER, M. D. Arch. Derm. and Syphilology, Feb. 1943.

Skin Diseases of the Ear. REGINALD T. BRAIN, M. D. Clinical J., Mar.-Apr. 1943.

Skin Diseases—Their Treatment by Ultraviolet Light. JOHN T. INGRAM, M. D. J. Chart. Soc. M. & M. Gym., March 1943.

Education

Motor Disabilities and Education. EIRENE COLLIS. Brit. J. Phys. Med. and Industrial Hygiene, Jan.-Feb. 1943.

Body Mechanics and Posture: A Program of Staff Education. FLORENCE L. PHENIX. Pub. Health Nurs., Mar. 1943.

Electrotherapy

Use of Amphetaminae Sulphas in Facilitating Electrically Induced Convulsions. K. C. BAILEY, M. D. Brit. Med. J., Feb. 27, 1943.

Electro-Surgical Excision of Pterygium: A New Method. DANIEL B. KIRBY, M. D. Amer. J. Ophthalmology, Mar. 1943.

Electric Shock Treatment and Prevention of Psychoses. RALPH S. BANAY, M. D. Arch. P. T., Mar. 1943.

Exercise

Muscular Exercise and Fatigue Disease. Editorials, J.A.M.A. Mar. 27, 1943.

Eye, Ear, Nose and Throat

Electro-Surgical Excision of Pterygium: A New Method. DANIEL B. KIRBY, M. D. Amer. J. Ophthalmology, Mar. 1943.

Skin Diseases of the Ear. REGINALD T. BRAIN, M. D. Clinical J., Mar.-Apr. 1943.

Foot Conditions

Neurofibroma (Neurinoma) of the Foot. EMIL D. W. HAUSER, M. D. J.A.M.A., April 10, 1943.

Painful Feet. J. Chart. Soc. M. &. M. Gym., Mar. 1943.

Fractures

Tangential Osteochondral Fracture of the Patella. J. E. MILGRAM, M. D. J. Bone and J. Surg., April 1943.

Heat and Cold

Is the Hypersensitiveness to Chemical and Physical Agents Allergic in Nature? J. BRONFENBRENNER, Ph. D. J. Allergy, Jan. 1943.

Influence of Heat and Cold on the Temperature of Mouth Tissues. ALEXANDER HERSH, M. D., FRANK T. WOODBURY, M. D. and WILLIAM BIERMAN, M. D. Arch. P. T., April 1943.

Hyperpyrexia

Combined Artificial Fever-Chemotherapy in the Treatment of Neurosyphilis. H. WORLEY KENDELL, M. D., WALTER M. SIMPSON, M. D., and DONALD L. ROSE, M. D. Brit. J. Phys. Med. and Indus. Hygiene, Jan.-Feb. 1943.

Shock in Fever Therapy Treated with Blood Plasma. LIEUT. ARTHUR M. PRUCE, M. C., A. U. S. J.A.M.A., Mar. 20, 1943.

Massage

Deep Friction. JAMES CYRIAX, M. D. J. Chart. Soc. M. & M. Gym., Mar. 1943.

Miscellaneous

Peyronie's Disease (Plastic Induration), Cause and Treatment. MILEY B. WESSON. J. Urology, Mar. 1943.

Physiotherapists and War Service. Brit. J. Phys. Med. and Industrial Hygiene, Jan.-Feb. 1943.

The Pathway to the Immediate Correction of Remedial Defects. MARGARET BELL. J. Health and Phys. Educ., April 1943.

Progressive Relaxation in Physical Therapy: An Experimental Course for Student Technicians. WALTER J. ZEITER, M. D., and BERNADINE LUFKIN. Arch. P. T., April 1943.

Nervous and Mental Diseases and Injuries

Use of Amphetaminae Sulphas in Facilitating Electrically Induced Convulsions. K. C. BAILEY, M. D. Brit. Med. J., Feb. 27, 1943.

Combined Artificial Fever-Chemotherapy in the Treatment of Neurosyphilis. H. WORLEY KENDALL, M. D., WALTER M. SIMPSON, M. D. and DONALD L. ROSE, M. D. Brit. J. Phys. Med. and Indus. Hygiene, Jan.-Feb. 1943.

Sciatic Nerve Injury Due to the Intramuscular Injection of Paraldehyde. FREDERICK G. WOODSON, M. D. J.A.M.A., April 24, 1943.

Symptoms and Diagnosis of Anterior Poliomyelitis in the Light of Recent Developments. WILLIAM BENHAM SNOW, M. D. Arch. P. T., April 1943.

Cultivated Relaxation for the Elimination of "Nervous Breakdowns." EDMUND JACOBSON, M. D. Arch. P. T., Mar. 1943.

Electric Shock Treatment and Prevention of Psychoses. RALPH S. BANAY, M. D. Arch. P. T., Mar. 1943.

Posture

The Effect of Postural Hypertension on the Development of Atheromatosis in Rabbits Fed Cholesterol. SIGMUND L. WILENS, M. D. Amer. J. Path., Mar. 1943.

Rehabilitation

Rehabilitation by Modern Methods of Exercise. NELLIE I. LANCKENAU, M. D. Brit. J. Phys. Med. and Industrial Hygiene, Jan.-Feb. 1943.

Work of the Red Cross in Postwar Medical Rehabilitation. RICHARD F. ALLEN. J.A.M.A., May 1, 1943.

Industrial Rehabilitation of Permanently Injured Workers. EDWARD C. HOLMBLAD, M. D. Arch. P. T., April 1943.

Muscle Rehabilitation by Active Motion. HANS KRAUS, M. D. Arch. P. T., Mar. 1943.

The Place of Motion Study in Rehabilitation Work. LILLIAN M. GILBRETH. Occup. Therapy and Rehabil., April 1943.

Injured Limbs Learn Their Job Anew. MAJOR G. D. KERSLEY and CAPTAIN L. H. WILKINSON. Occup. Therapy and Rehabil., April 1943.

Employment and Placement of Handicapped in Industry. HARVEY BARTLE, M. D. J.A.M.A., Mar. 27, 1943.

Respiratory Diseases

Urban Air Pollution and Respiratory Diseases. CLARENCE A. MILLS. Amer. J. Hygiene, Mar. 1943.

Therapeutic Procedures in Bronchial Asthma. W. C. SPAIN, M. D. N. Y. State J. Med., Sept. 1942.

Common Respiratory Infections. C. S. KEEFER, M. D. J.A.M.A., Mar. 13, 1943.

Rheumatic Fever

Diagnosis of Rheumatic Fever. ARILD E. HANSEN, M. D. J.A.M.A., Mar 27, 1943.

Epidemic of Rheumatic Fever. SOL P. DITKOWSKY, M. D., EDWARD STEVENSON, M. D., and JOSEPH M. CAMPBELL, M. D. J.A.M.A., Mar. 27, 1943.

Rheumatic Fever. ROBERT L. JACKSON, M. D. Crippled Child, April 1943.

Tuberculosis

Collapse Therapy in Treatment of Pulmonary Tuberculosis. G. A. HEDBERG, M. D. Minn. Med., May 1943.

Diagnosis of Early Tuberculosis Among University Students. RUTH E. BOYNTON, M. D. Minn. Med., May 1943.

Ultraviolet Radiation

Effect of Ultraviolet Radiation on Body Weight of Mice. HAROLD F. BLUM, HUGH G. GRADY and JOHN S. KIRBY-SMITH. Amer. J. Physiology, Jan. 1, 1943.

Ultraviolet Irradiation of Blood in the Treatment of Escherichia Coli Septicemia. E. W. REBBECK, M. D. Arch. P. T., Mar. 1943.

Sunlight Carcinoma and Other Tumors Induced by Ultraviolet Radiation. Editorials, J.A.M.A., April 17, 1943.

Skin Diseases—Their Treatment by Ultraviolet Light. JOHN T. INGRAM, M. D. J. Chart. Soc. M. & M. Gym., Mar. 1943.

Ultraviolet Radiation in Reduction of Respiratory Cross Infections. ELIZABETH CHANT ROBERTSON, M. D., M. ELIZABETH DOYLE, M. A., and F. F. TISDALL, M. D. J.A.M.A., Mar. 20, 1943.

War Injuries

Treatment of War Wounds and Fractures. IGNACIO PONSETI, M. D., and JOSEPH P. GURI, M. D. Northwest Med., Mar. 1943.

Treatment of Craniocerebral Injuries in Modern Warfare. GEORGE S. BAKER, M. D., and ALFRED W. ADSON, M. D. Minn. Med., Mar 1943.

Physical Therapy in War: A Primer on Indications and Technic. RICHARD KOVACS, M. D. Arch. P. T., April 1943.

ABSTRACTS

John S. Coulter, M.D.

Extrahuman Source of Poliomyelitis

Editorials, J.A.M.A., 122:1:40, May 1, 1943.

Virus infected rodents may be the source of outbreaks of human poliomyelitis, according to a recent report by Jungeblut and Dalldorf of Columbia University. Five cases of poliomyelitis occurred during September and October 1942 within a sharply circumscribed half square mile area in White Plains, N. Y. The cases occurred in rapid sequence and were the only cases of poliomyelitis reported in White Plains for over a year.

In the search for possible extrahuman sources of this epidemic a dead gray house mouse, which obviously had been dead for only a short time, was discovered in the basement of the home in one of the fatal cases. Additional house mice, dead or alive, were collected in other parts of the epidemic area. Ten per cent saline suspensions were prepared from the glycerated brains of these mice and injected intracerebrally into white mice. Definite symptoms were observed in white mice injected with these suspensions.

From their experiments the New York investigators concluded that the dead and trapped mice of the local area were presumably suffering from the same virus infection as the human patients.

The observations of Jungeblut and Dalldorf may well constitute one of the most important contributions to the epidemiology of poliomyelitis of the present decade, since it is the first time that a probable extrahuman source of human poliomyelitis has been supported by experimental evidence. Faber's recent demonstration of the hypersusceptibility of the oropharyngeal surface to virus of poliomyelitis adds to the concept of human poliomyelitis as a mouse borne food infection.

Electrical Skin Resistance Technic Used to Map Areas of Skin Affected by Sympathectomy and by Other Surgical or Functional Factors

Fred G. Whelan, B.E., and Curt P. Richter, Ph. D., Baltimore. In Arch. Neurology and Psychiatry, 49:3:454, March 1943.

During the past two years we have shown by means of the electrical skin resistance method, or measurement of resistance offered to passage of minute direct current through the skin, (1) that areas of skin affected by upper thoracic or lumbar sympathectomy can be sharply defined on any part of the body, such areas having an abnormally high resistance; (2) that the patterns of these areas closely correspond to the sensory dermatomes and to areas which do not sweat, as was demonstrated by the Minor starch-iodine-sweating test (Richter and Woodruff); (3) that areas affected by injection of procaine or alcohol into the sympathetic chain can be quickly and sharply defined, often within a few minutes after injection (Shumaker), and (4) that the skin of normal persons manifests rather constant and hitherto entirely unsuspected areas of low electrical skin resistance on the face, hands, feet, axillas, and antecubital fossae.

A simplification of the nonpolarizable electrodes ordinarily used for studies of skin resistance has made it possible to map these areas of high and low resistance on the skin.

Treatment of Fractures of Hands and Fingers Caused by Gunshot Wounds

By V. Gusynin, Professor, Chair of Neurosurgery at Lenin Postgraduate Medical College of Kazan and Consultant, Military Hospital of Tartar Soviet Republic. In J.A.M.A., 121:12:952, March 20, 1943.

Fractures of hands and fingers caused by gunshot wounds are frequent war injuries. The correct treatment is fixation and stretching the fingers over a solid cylindric body. This gives the fingers the physiologic half-contracted position. Fixation on a cylindric splint should be centralized on the fractured bone and pressure exerted on the point of fracture. A fixing bandage is applied with turns of the bandage crossing behind the broken bone at the point of fracture.

I also have proposed the use of a so-called "drum splint," consisting of a wooden cylinder fixed to the split end of a flat splint. The flat splint is placed on the palm side of the forearm and injured fingers are placed around a cylinder. When necessary, the fingers are stretched by elastic bands fastened to the flat splint in a centripetal direction.

Fixation of fingers in a functionally essential position also may be carried out by use of a simple wooden roller.

In field conditions, a bottle 6 or 7 cm. in diameter may be used as a cylinder splint for fingers. The bottle is convenient because it can be used for physical therapy heat treatment, the bottle being filled three or four times a day with warm water.

Bone and Joint Injuries

R. Watson-Jones, M. Ch., F.R.C.S., Orthopedic Surgeon, Liverpool Royal Infirmary. In Lancet, I:VI:172, February 6, 1943.

Rehabilitation

"This is the greatest error in the treatment of sickness, that there are physicians for the body and physicians for the soul, and yet the two are one and indivisible."

The principle of rehabilitation thus was enunciated 2000 years ago by Plato. Rehabilitation is not the specialty of physical therapists, electrotherapists or occupational therapists; it is not the specialty of physical training instructors or medical gymnasts; still less is it the specialty of a newly created body of experts which surely will arise if the Royal Colleges misguidedly accept the recent Tomlinson recommendation and institute diplomas in rehabilitation. It is true that masseuses, occupational therapists and physical training instructors as well as physicians, specialists and surgeons must be trained. But they must be trained to treat the whole disability and not just part of it. Take, for example, the application of rehabilitation to the treatment of bone and joint injuries, which I have been advocating for nearly ten years through the deliberations of British Medical Association, Trades Union Congress, British Orthopedic Association and many other fracture and rehabilitation committees. We were content to treat the fracture and expected the patient in his ignorance to treat the wasted muscle and stiff joint, though he had no medical training to discriminate between the pain of a stretching adhesion which called for exercise, and the pain of an unexpected complication which called for rest; a patient who had broken his leg was discharged from hospital as "cured" when no-one had any idea whether he could run, whether he had learned to jump, or whether he could climb stairs. It is astonishing that so little attempt was made to explain to a patient the nature of his disability and to relieve his natural fears and misgivings. Physical treatment was but half completed; psychological treatment was wholly neglected. And when a patient drew the apparently obvious conclusion that there was a residual and permanent disability and turned to the only refuge he knew—the refuge of litigation and lump sum settlement—we blamed him and called him a malingerer. Was there ever greater injustice? Malingerers are made, not born. Malingering is a complication of fracture treatment no less certainly under the control of the surgeon than malunion and nonunion. But though a part of the technic of rehabilitation is to teach the patient to walk, run and jump, and to arrange for active exercises, graduated stresses, occupational activities, games and recreations, the principle is more profound. John Buchan put it in these words: "It is not enough to have specialists for psychological diseases and for physical diseases; the same man must in a sense be both. A good doctor should be, and indeed always has been, something of a psychologist." A good nurse, a good masseuse, a good medical gymnast also is something of a psychologist; the whole team is trained in rehabilitation. We must not perpetuate the 2000 year old error—we must not separate rehabilitation from medicine and surgery. Above all we must not train "rehabilitationists." When the surgeon himself, with the aid of every member of his team, gives the patient confidence, explains his problems, anticipates his fears, reassures his mind, and completes his treatment, then he becomes a physician of the body and the soul. He leaves the ranks of "physicians doomed to the practice of surgery;" he joins the ranks of surgeons dedicated to the practice of medicine of the soul.

The Flexion Treatment for Low Back Pain: Indications, Outline of Conservative Management, and a New Spine-Fusion Procedure

Louis W. Breck, M. D., and W. Compere Basom, M. D., El Paso, Texas. In J. Bone and Joint Surgery, 25:1:58, January 1943.

The treatment varies somewhat according to whether the backache is acute or chronic, and whether it is severe or mild. The acute severe cases are best treated by putting the patient in a hospital bed with the back rest raised to forty-five degrees, and the knee rest raised almost as far as it will go. If the patient is not in a hospital bed, he can be treated at home by means of a back rest and a knee support which place him in a position similar to that just described. This can be done easily and inexpensively by means of two box-like supports, devised by the authors, which are made of one-half inch plywood. Pillows are placed over each of these. The back rest is triangular in shape in the side view, and measures eighteen inches on the two sides and twenty-five inches on the other. It is twenty-two inches wide, and the long side, where the patient's back rests, is made in two pieces with the center depressed four inches in a hollowed-out manner, which makes the back rest much more comfortable. The knee rest is a flat box-like arrangement with the two sides measuring seven inches high and twenty-two inches long. The patient is kept on his back with the back rest and knee rest in place part of the time (usually two hours at a time, three or four times a day), and the rest of the time he lies on one side with his knees drawn up. He is advised never to lie flat on his face or flat on his back with hips extended.

In addition to this, heat is used in the form of short wave diathermy or a heat lamp, Massage also is given to help alleviate the pain and muscle spasm. The patient is given flexion exercises in bed the first day. The first exercise consists of pulling the knees up to the chest with the spine

flexed, and the neck and chest brought well forward toward the knees. The patient is instructed to do this six times a day, starting with once each time, and increasing until he is doing it ten times, six times a day. The patient usually is very much improved by the end of three to seven days, and then can be up and about. A few days later he ordinarily can return to work.

It is felt that the most important part of the treatment is to impress upon the patient the importance of flexing his lumbar spine and keeping it flexed.

Summary

There is a sound basis for the flexion treatment of low backache due to a narrowed lumbar disc, regardless of whether the pain is due to a protruded disc, or subluxation of the lumbosacral or lumbar facets.

Conservative flexion treatment as outlined, and utilizing new apparatus has been found efficient for home treatment.

A new spine-fusion procedure, using a mortised interspinous bone block, has been successful in restoring the intervertebral interspace to normal, in reducing the accompanying subluxation, and in giving internal fixation to the routine spine-fusion grafts.

Studies on the Use of Refrigeration Therapy in Mental Disease with Report of Sixteen Cases

Douglas Goldman, M.D., and Maynard Murray, M.D. In J. Nervous and Mental Dis., 97:2:152, February 1943.

The general physical status of patients subjected to refrigeration was in every case determined by physical examination, blood studies, and chest x-rays, and electrocardiograms in some instances. Serial determinations of various blood constituents were made in most treatments, electrocardiographic studies were made in some.

To produce the cold environment necessary for maintenance of the body temperature at a low level, a large cabinet was used. The design of this cabinet was in some respects similar to that of "fever" cabinets in common use.

Return to average temperature was accomplished by removal from the cabinet, and packing in warm blankets with hot water bottles. Oral or nasal gavage of hot coffee and similar fluids usually was used also. Return to normal temperature took 3 to 8 hours as a rule.

It was difficult to distinguish effects of cold from effects of the sedatives used at times. Some patients were entirely unconscious throughout the procedure; others seemed awake and partly cooperative, at least, even with temperatures of 82 to 85 F. Most patients had some muscle rigidity throughout the low temperature period.

Observations are presented. The chief changes noted on blood and chemical changes were: (1) a variable degree of hemoconcentration, with increase in polymorphonuclear cells and leucocytosis in some cases; (2) a tendency in most patients to lowering of the blood sugar, sometimes very marked; (3) nitrogen retention which occurred in every case; (4) lowered CO_2 combining power; (5) moderate drop in blood chloride.

The chief complications resulting from the treatment were skin injuries from ice, and respiratory infections.

Two deaths occurred as a direct result of the treatment. Autopsy in each case confirmed the clinical diagnosis of widespread pneumonia.

Of chief interest are the results produced by the treatment on the mental status of the individual patients. This was invariably disappointing. Some transient, incomplete improvement was noted in some but this was as much attributable to the sleep induced by intravenous sedatives as to the lowered temperature. None of the fourteen surviving patients was permanently improved immediately after treatment.

In view of the marked risk of this treatment with relatively little mental improvement in comparison with the slight risk and frequent marked improvement associated with insulin, metrazol, and electric shock treatment, and even with lobotomy (Freeman and Watts), refrigeration therapy in psychoses has been suspended, at least for the time being.

War Neurosis, Experiences of 1914-1918: Lessons for the Current Emergency

Douglas A. Thom, M.D., Boston, Mass. In J. Laboratory and Clinical Med., 28:4:499, January 1943.

The therapy of war neuroses varied with the different schools of thought. Some felt the approach to these problems was through analytical procedures and others felt that suggestion and hypnosis were more useful. The hysterical patient always was very urgent in protesting against the illness and wanting to get over it. The electrical current would be applied and increased as found necessary, with continuous suggestion that function was to be restored. It is purely a matter of suggestion, and in a surprisingly short period, with the use of the current and help from the patient, the muscles would contract; then the contractions would take place without the current. You show him, talk about it, demonstrate to him that there was function. Under the stimulation of the current the leg would jerk, and he would get cramps, some of them painful, and under the excitement he would find that he could move the leg, stand on it, walk. It always was desirable to spend a certain length of time with the patient after function had been restored, explaining the purpose of the paralysis, how it may come back under stress, and ways and means of preventing a recurrence of difficulty. After restoring function, the patient always was returned to his ward for the psychological effect on other patients.

Reflexes From the Limbs as a Factor in the Hyperpnea of Muscular Exercise

J. H. Comroe, Jr., and Carl F. Schmidt. From the Laboratory of Pharmacology, University of Pennsylvania, Philadelphia. In Amer. J. Physiology, 138:3:536, February 1, 1943.

The results of these experiments fully confirm Harrison's claims as to the existence of stimulant reflexes to respiration associated with movements of the limbs, but we are not prepared to accept his conclusion that: "The increase in ventilation produced by mild muscular movements is reflex in origin." We have no hesitation in affirming that these reflexes play a part, but from the data now available we are forced to conclude that the reflexes fall short in several important respects from the requirements of a complete explanation.

At present we prefer to conclude that the reflexes constitute only one of several factors involved in this hyperpnea. This conclusion seems to us to be advisable in view not only of existing experimental evidence but also of the history of respiratory physiology, which has been characterized by a series of attempts, all of which eventually have turned out to be mistaken, to explain too many observations on the basis of a single, simple theory. From the evidence now available we believe that "increased excitability" of the respiratory center during muscular exercise (i.e., hyperpnea without corresponding in cH or pCO_2 in the arterial blood) probably is due in part to excitatory afferent impulses from the limbs, in part to irradiation of excitation from cortico-spinal nerve fibers into the reticular formation of the medulla, and perhaps in part to afferent impulses from the lungs, aroused there by the changes in the pulmonary circulation associated with exercise. To attribute great importance to reflexes involving the pulmonary circulation is in line with the most recent trend of thought concerning the hyspnea of heart disease, but evidence as to the applicability of this conception to normal subjects is lacking at present. As for reflexes from the limbs, it is possible (though in our opinion improbable) that the sum-total of all the afferent impulses aroused during muscular exercise eventually will afford an adequate explanation for the concomitant hyperpnea, particularly when there is also an increase in metabolic activity to prevent reduction in the stimulus level in the arterial blood during the hyperpnea. One the basis of *a priori* reasoning one would expect reflexes aroused in muscle chemoreceptors by accumulated products of muscle metabolism to be a much more important factor than reflexes from proprioceptors in the joints, and it is interesting to note that the first modern attempt at explaining the hyperpnea of exercise ascribed the major role to reflexes set up in the muscles by carbon dioxide. Yet our results compel us to discard this attractive possibility and to conclude that, although respiration and circulation can be stimulated by reflexes aroused in the limbs by chemical substances, these phenomena are related to pain and not to a specific reflex system of physiological importance.

Summary and Conclusions

In human subjects exercise of one forearm and hand caused distinct hyperpnea, which was increased if the circulation was cut off. The potentiation by ischemia probably was due simply to pain. In analogous experiments on anesthetized dogs and cats, "exercise" of the hind-limbs (produced by stimulation of the ventral spinal roots) also caused hyperpnea, which in the dog was not influenced by ischemia but was abolished by transection of the spinal cord while in the cat it was reduced or abolished by ischemia, unaffected by cord transection. This hyperpnea therefore was due mainly to reflexes in the dog and in man, to direct central stimulation by chemical products of muscle contraction in the cat.

Various methods were used to detect a specific chemosensitive reflex system in the limbs, without success. Passive movements however produced hyperpnea in dogs, cats, and men, the effect being most marked in man and least marked in the cat. The reflex nature of this hyperpnea was proved by its absence after denervation of chordotomy in animals and by its diminution during spinal anesthesia in man. By means of traction on muscles and tendons and of local anesthesia of the periarticular surfaces, the reflex was shown to arise largely or wholly in and around the knee joint, not in the muscles or tendons.

The possible significance of these findings to the respiratory response to muscular exercise is discussed and reasons are given for believing that while reflexes of this type unquestionably account for some of the hyperpnea, they probably cannot account for all of it.

The Results of Poliomyelitis in Baltimore

Raymond E. Lenhard, M.D., Baltimore, Maryland. From the Children's Hospital School, Baltimore. In J. Bone and Joint Surgery, 25:1: 132, January 1943.

The report of the results of poliomyelitis in Baltimore is a study of the epidemic of 1941, with particular reference to the recovery of individuals and of extremities. In the report is also a study of cases of poliomyelitis treated in previous years, and observed for the degree and the rapidity of recovery of specified muscles.

In order to record the results in the aftercare of poliomyelitis, it seems necessary to have some measurement of the degree of muscle involvement. Until some better method of estimating muscle power is devised, it is possible to isolate muscles, and to express their action in terms of strength, which can be graded in percentages of normal. If a well-trained physical therapist examines the same patient throughout the duration of the treatment, the record is an accurate estimate

of the progress of the paralyzed muscles.

In the treatment of poliomyelitis, rest for paralyzed muscles is emphasized, but rest does not constitute complete immobilization. The extremities are supported in plaster shells, wire splints, or braces, which allow relaxation of the weaker muscles. The body is slightly flexed in bed or on a curved frame to prevent stretching of the abdominal muscles. Radiant heat is used for the stimulation of circulation, and massage is given as soon as soreness has disappeared. Passive movement of joints is carried out through a restricted range, in direct ratio to the amount of muscle weakness. Exercises are begun early and consist in assistive motion, which is increased in degree as the muscles show recovery.

All treatment is given carefully and is dependent upon muscle examination. An estimation of muscle power is made at each treatment to prevent too vigorous therapy which might cause fatigue. A record is made of the muscle power every six weeks or every three months.

A great many patients who have poliomyelitis with paralysis recover rapidly and completely, with little or no treatment. The great problem is to determine what treatment to use, and how long to continue it with patients who do not recover spontaneously.

Conclusions

These studies offer a basis for the comparison of epidemics. In 1941 in Maryland 68 per cent of the patients recovered and 14 per cent more have a slight residual weakness. Only 2 per cent have complete disability. The treatment was protective care and physical therapy for weak muscles. There was no complete immobilization of the patient or of extremities.

The patients who do not recover rapidly or spontaneously need prolonged treatment in an effort to bring the weak muscles to their maximum power.

Muscles do not improve in direct ratio to the degree of initial weakness and may continue to improve for eighteen months in those cases treated immediately after the onset of the poliomyelitis. Patients seen later may improve for a period up to nine months.

A Review of the Drastic Shock Therapies in the Treatment of the Psychoses

Franklin G. Ebaugh, M.D., F.A.C.P., Denver, Colorado. In Annals of Int. Med. 18:3:279, March 1943.

The author has presented the present day methods and therapeutic application of the drastic therapies of the psychoses by the use of pharmacological shock therapy, such as insulin and metrazol and electric convulsive therapy. The mode of action of these therapies continues unknown although there have been many theories regarding their beneficial therapeutic effect. These therapies undoubtedly serve as an ace in the hole to supplement other therapeutic methods. Insulin shock therapy may make schizophrenic patients more accessible to psychotherapy. Metrazol is now being discarded by many clinics for electric convulsive therapy which is simpler and perhaps less drastic and hard on the patient, and because, when combined with curare, the complication of fractures is eliminated. Both metrazol and electric convulsive therapy have proved to be of little benefit in the treatment of schizophrenic reactions but of considerable benefit in the treatment of the affective disorders, especially the depressive reactions. These drastic therapies were inaugurated with uncontrolled enthusiasm and, as has been true historically in other types of therapy, probably have been made to appear more promising than is actually the case. On the other hand they have aroused tremendous interest in mental hospitals and have emphasized the importance of treatment of serious psychotic reactions, with the resultant changes in the attitude of the personnel of these institutions as well as patients and their relatives and the general public. They have presented numerous problems for research of physiological, psychological, biochemical and histopathological import and have increased further the necessary collaboration between internal medicine and psychiatry.

Whether these procedures are a permanent part of our therapeutic armamentarium or not cannot be stated at this time. Better controls, great uniformity, a better balanced psychotherapy with shock therapy, and better follow-up studies based on complete social, physical and psychological examinations must be made.

Postural Changes in Respiration

Elizabeth Brogdon Franseen and F. A. Hellebrandt. From the Departments of Physiology, Mount Holyoke College and the University of Wisconsin. In Amer. J. Physiology, 138:2:364, January 1, 1943.

Respiratory movements sometimes are considered as a subsidiary line of defense against orthostatic collapse by virtue of expiratory compression of the abdomen and inspiratory thoracic suction. Hill and Barnard in 1897 showed that when splanchnic vasomotor tone of their animals was destroyed, respiratory effects maintained the circulation, though far less efficiently. On the basis of plethysmographic experiments with dogs in 1933, Eyster and Hicks believe that the influence of the extent of breathing on venous return is not as great as is ordinarily stated. More recently, Boyd and Patras (1941), using a cardiometer in the closed chest, have reported increases in diastolic and stroke volume with inspiration which were exaggerated by the deep and prolonged breathing following vagotomy.

In our experiments it is impossible to evaluate the importance of this respiratory pump as an aid to the circulation. Respiratory behavior is shown to be closely related to cardiovascular competence. It is augmented as the gravitational

handicap to the circulation is made greater and approaches normal when the compensatory action of postural sway reduces that handicap. With few exceptions both fainter and nonfainters responded with some augmentation of ventilation to protracted support in near-verticality. However, the point of failure of the circulation did not appear to bear any time relationship to the percentage increase in ventilation. Whether the increase in breathing prolongs the period of tolerance for the erect position through aspiratory action can only be a matter of conjecture. The fact that the increases observed were in many cases due to rises in rate with reductions in amplitude renders this unlikely. The augmented ventilation seems rather a reflection of the general slowing of the circulation in which the medullary centers are more or less seriously deprived of oxygen unless more effective compensatory mechanisms combat the pull of gravity upon the blood column. Of these, the rhythmic squeezing action of muscle is clearly important.

Conclusions

1. Respiratory changes induced by alteration of posture outstrip concomitant metabolic increases as verticality is approached.
2. Increases in ventilation in vertical postures appear to be secondary to interference with blood flow to the head.
3. Postural sway is a factor of material benefit in combatting orthostatic hyperpnea.

Rehabilitation in an E.M.S. Orthopedic Unit

S. Alan S. Malkin, M.B., B.S., F.R.C.S. Ed., Surgeon-in-Charge, Harlow Wood Orthopedic Hospital, Nottingham; Orthopedic Surgeon, Mansfield and District General Hospital and Gilbert Parker, M.B., Ch. B., F.R.C.S. Ed., Hon. Assistant Surgeon, North Riding Infirmary, Middlesborough; Acting Assistant Surgeon, Harlow Wood Orthopedic Hospital, Nottingham. In Brit. Med. J., No. 4288:315, March 13, 1943.

Rehabilitation, it has been stated, begins not in a special center but in a hospital bed, and ends with a return to full pre-accident activity. All bed patients perform general and special bed exercises regularly. For those confined to bed with leg injuries occupational therapy of a remedial nature is not possible, but diversional work is started in bed.

When a patient is walking satisfactorily in plaster he is transferred to one of the associated auxiliary hospitals. To these auxiliary hospitals go all cases in walking plasters, upper-limb fractures in and out of plaster, etc.

Here the day begins with general exercises in which all patients join. Later, group exercises are carried out, particularly directed to the affected limb. We find general exercises en masse useful, as the men in plaster vie with those out of plaster in the energy of their movements, and it is remarkable how small a disability a long leg plaster can become. Exercises are followed by and interspersed with organized games. Those unable to take part in organized games indulge in less energetic pastimes; croquet is a particular favorite with the early walking-plaster cases, and a man who says he can walk only a few hundred yards without tiring will walk much farther in the course of an afternoon's heated croquet.

We endeavor to find jobs at the auxiliary hospitals to act as occupations with a therapeutic value, although diversional work is continued in the evenings.

When he is walking satisfactorily he is transferred to the rehabilitation annexe.

Rehabilitation Annexe

To this annexe are transferred all cases of fracture out of plaster (except minor cases requiring little rehabilitation), fractured spines, both in and out of plaster, severe soft-tissue injuries, and all knee-joint injuries—e.g., cartilages three weeks after operation. During the year Sept. 1941, to Aug. 1942, 295 patients were admitted to this annexe.

All treatment, whether in physical therapy classes or by resistance exercises, etc., is liberally interspersed with rests. We must never overtire the muscles we are trying to redevelop, nor throw too much strain on a joint which is mobilizing and not yet controlled by sufficiently strong muscles. To hurt the patient by too vigorous or too prolonged treatment is not only to lose his confidence but to retard his progress. A certain amount of pain is inevitable as a joint released from plaster begins to mobilize, but by judicious graduation of exercises, the use of radiant-heat baths, massage, novocain injections, and manipulation in selected cases, treatment can proceed with minimal discomfort.

The morning's work ends with a period of organized games or swimming before lunch. In the afternoon a similar programme is carried out, games taking up a larger proportion of the time, until tea-time. From tea-time onwards (about 4:30 p.m.) the men are free to do as they please. There are facilities for indoor games. Many walk in the surrounding country in the summer; a larger number prefer to continue the diversional work they have learned as bed patients in the parent hospital.

Occupational Therapy

A large hut has been equipped for occupational therapy at the parent hospital. The department is staffed by technicians trained in the various handicrafts, and the work is supervised by a medical officer and the senior masseuse. This enables the work of the occupational therapy and physical therapy departments to be coordinated satisfactorily. We agree with Watson-Jones (1942) that a remedial workshop is not a rehabilitation center, and in the treatment of Service injuries occupational therapy is only an adjunct to more active

rehabilitation. We have found it particularly useful in the early mobilization of stiff joints—e.g., fingers and shoulders. In patients so severely injured as to be discharged from the Services—in which more energetic treatment is ruled out by the disability—we have found occupational therapy of considerable value. In reconstructional surgery of the severely injured it will no doubt prove a useful preliminary to the later vocational training.

The Treatment of the Injured Workman

William Gissane, Ch.M., F.R.C.S. Surgeon-in-Chief and Clinical Director, Birmingham Accident Hospital and Rehabilitation Center; Lecturer in Clinical Surgery, University of Birmingham. In Practitioner, CXLIX:6:349, December 1942.

Experience shows that about 80 per cent of injured patients do go back to work at the completion of what is termed "the surgical cure," i.e., as soon as the fracture is united or the soft tissue wound is soundly healed. But in approximately 20 per cent of cases this surgical cure and the ability of the patient to go back to work do not correspond. This group of patients, owing to the severity of their original injuries or to their resistance to treatment, require at the end of hospital treatment a period of reconditioning. This period of reconditioning is ideally carried out in centers away from the hospital and on a full-time residential basis—away from the hospital, because it is good at this stage to leave behind the hospital atmosphere.

Treatment at these centers is both specific to the injured part and general to the body as a whole. It has been found necessary to combine the essential long periods of exercise with occupations that have the necessary mental stimulus, and the term "occupational therapy" therefore has been coined. Further, "recreational therapy" is therefore a phase of treatment. Both these forms of treatment have in the foreground a mental interest, but behind both is the solid body of graduated exercises designated to build up physical fitness.

These centers, in which the reconditioning of the body and mind after hospital treatment is organized on a rational basis, are known as "Rehabilitation Centers." Yet rehabilitation in the full sense of the word cannot be separated from surgical treatment. The best results following an injury are obtained only when first-class surgical treatment is followed by organized reconditioning, and the whole process should be known as "rehabilitation."

A phase of rehabilitation of the injured workman can with great advantage be carried out within industry. In such large organizations as "X", a well-known firm employing tens of thousands of workmen, reconditioning within the factory is the present practice. A workman, as soon as he reaches a stage of recovery at which he can do some useful work, is employed in the factory and at his pre-accident wages. A job is found for this workman at which he can be usefully employed, and under medical supervision while at work he is gradually upgraded by jobs until he reaches his pre-accident state. The advantages of such a system are obvious. The system is not the old one of "light work" which never did meet the workman's needs. It is a definite effort on the part of an enlightened employer to help his workpeople along the road to recovery, and as such is deserving of special notice. The term "light work" should not be used in connection with this phase of rehabilitation. Some term, such as "graded work," "trial work" or "work therapy," might impress upon the workman the fact that this is a phase in treatment, rather than a job in which he can waste away the rest of his days. The practice could be adopted with advantage by every employer of large numbers of workpeople.

Blood Flow in Extremities Affected by Anterior Poliomyelitis

David I. Abramson, M.D., Kamillo Flachs, M.D., Joseph Freiberg, M.D., and I. Arthur Mirsky, M.D., Cincinnati. In Arch. Int. Med., 71:3:391, March 1943.

The rate of blood flow during rest was measured by the venous occlusion plethysmographic method in a series of 27 subjects with acute or chronic anterior poliomyelitis of one extremity.

It was found that in the majority of cases the peripheral circulation in the paralyzed limb was the same as that in the contralateral normal extremity; in fact, in some instances it was even significantly greater.

Evidence was obtained which indicated that the cutaneous blood vessels in the extremity affected by anterior poliomyelitis respond more markedly to the stimulus of cold than do those of the contralateral normal limb. The response takes the form of excessive vasoconstriction on exposure to a low environmental temperature and is apparent as a significant decrease in cutaneous temperature.

By studying the changes in blood flow during the reactive hyperemia elicited by a period of arterial occlusion, some evidence was obtained which suggested that the metabolism of muscles atrophied by poliomyelitis is the same as that of normal tissues.

In view of the lack of evidence for the hypothesis that in persons with anterior poliomyelitis the peripheral circulation is reduced, it is concluded that those treatments which have for an aim the increase in blood flow through the affected parts should be critically reexamined for their therapeutic value.

The Action of Radiant-Heat Cradles

G. Malcolm Brown, M.D., Ph. D., David S. Evans, M.A., Ph. D. and K. Mendelssohn, M.A., Ph. D. (From the Nuffield Department of Clinical Medicine, Oxford). In Brit. Med. J. No. 4280:66, January 16, 1943.

The investigation was undertaken after two serious burns had occurred with the use of the Ministry of Home Security heat cradle. Questioning of senior sisters revealed no standard procedure in the heat-cradling of cold or shocked patients, and none was found in the literature. Aside from this lack of knowledge concerning the proper use of a powerful instrument, it was obvious that the cradle was needlessly dangerous, and that the customary procedure which made it tolerable—the protection of the patient by a blanket—greatly reduced its efficiency. Heat administration should be as carefully controlled as the administration of drugs or oxygen.

By simple modifications which a handy-man can carry out in an hour or so, a heat cradle has been devised which gives complete protection from early burns and which heats the patient much more quickly. The near infra-red component of the radiation has been converted with negligible energy loss to far infra-red, a type of radiation for which the skin evidently has a greater tolerance. This permits the withdrawal of the protection afforded by the blanket. The ability to control accurately the dosage of heat has resulted in the elimination of late burns, and is of obvious value in careful treatment. With the shielded cradle it is possible to expose the patient in a heat bath at any desired temperature without ever exceeding that temperature.

There remain certain dangers. With the unshielded cradle the risk of burning the skin, or actual burns, often must have prevented the introduction into the body of a dangerous amount of heat. When that costly safeguard is removed, more careful supervision of heat treatment is demanded. Under some conditions we have found that the patient's temperature rose at the rate of 2 F. in 20 minutes. This is a state which demands skilled observation, and we are firmly convinced that medical officers should supervise the use of the heat cradle more closely and not regard it as an instrument which can be left without instruction to the nursing staff.

The question of the place of heat in the treatment of shock is made more urgent by the more efficient cradle. There is little doubt that it can be overdone. Blalock and Mason have found that exsanguinated and traumatized animals survive longer if they are cooled rather than warmed, and our own observations show that soon after application of heat the blood pressure falls. Vasodilatation of the skin and enlargement of the vascular bed may well be harmful in shock. Some experimental work is being carried out to elucidate this point, but there is need for more observations on shocked patients.

Summarized Instructions for Use of the Shielded Cradle.—(1) Place the upper end of the cradle at the level of the lower end of the sternum. (2) Cover the cradle and its open ends with two blankets, and do not distrub these unless absolutely necessary. (3) Leave the patient naked except for a small hand towel to protect the groins, and if the patient is restless insert the guard. (4) At first turn on all 12 bulbs. (5) After not more than 30 minutes reduce the bulbs to the number required to maintain the air temperature at the desired level. (6) Determine the oral temperature at least every 15 minutes.

Summary

The heat cradle issued by the Ministry of Home Security has been modified by shielding the bulbs and blackening the reflector.

As a result of the conversion of the short wave infra-red radiation into long wave infra-red the risk of burns is almost eliminated and the patient can be heated at least twice as rapidly.

The danger of overheating the patient is emphasized.

Instructions are provided for using the new cradle.

Planning for the Treatment of Head Injuries

Hugh Cairns, D.M., F.R.C.S., Brigadier, Consultant Neurosurgeon; Nuffield Professor of Surgery, Oxford. In Brit. Med. J. No. 4288:313, March 13, 1943.

There is nothing new about rehabilitation. For example, it has been practiced systematically for over 50 years by those responsible for the care of the blind and to what high standard this work has been raised in this country may be seen in the British Council's fine documentary film **Out of the Night.** In each broad group of maladies the methods of aftercare are to a considerable extent specialized. In the case of blindness this is obvious. After limb injuries the physician responsible for getting the patient fit for work must be competent to judge whether the position of the bone and the union of the fracture are satisfactory; and in this group of cases physical reeducation is important. After head injuries rehabilitation always must be based partly on thorough neurological examination; physical reeducation, as has previously been pointed out (Cairns, 1942a, 1942b) plays a small part.

If there is one thing common to rehabilitation after all varieties of accident and disease it is the need for study and understanding of the personality of the patient and of his social circumstances, and this should be the duty of every physician who treats a patient. The "new" things in rehabilitation are the more general realization by the medical profession of its responsibilities for convalescence of all patients, and the formal recognition of the part which a patient's personality plays in his readjustment after injury or dis-

ease. The importance of the social worker in rehabilitation also is becoming more generally accepted.

It would be harmful if people came to think that rehabilitation consisted of physical therapy or some other technical method of treatment, or that it was the particular province of any group of specialists. To set up a specialty of rehabilitation would be akin to establishing specialties for diagnosis or for therapy. In a national scheme all varieties of medical specialist would be involved, and the general practitioner and the industrial physician would be more essential than any of them. The whole medical profession would be involved. In ancillary services the social worker would be at least as important as the masseur. Extension of rehabilitation to all sick and injured persons obviously would require a large increase of social workers and physicians, whose training for this work would tend to become standardized. But in each group of diseases or injuries successful rehabilitation depends to some extent on special knowledge of the disabilities produced by the disease or injury in question, and of the reactions of patients to these disabilities. Trained experts would deal with the cases requiring institutional aftercare, mostly in special centers, from which advances in knowledge of the social aspects of ill health might be expected. But, if the experiences with head injuries are any guide, it would seem that much of the aftercare of the nation's sick and injured should continue to be directed by the physician who treats the patient in the acute stage of his illness. If in his student days he can be taught the aftercare of patients in a practical way, and if he can be supplied with more precise knowledge of the social prognosis of diseases, and with adequate assistance from social services and from employers, this task should not be beyond him.

Rehabilitation by Modern Methods of Exercise

Nellie I. Lanckenau, M.D., B.S., Physican in Charge of Physical Therapy, St. Mary's Hospital, London; Adviser in Physical Therapy, Sector 6 Hospital, E.M.S. In Brit. J. Physical Med. and Industrial Hygiene, 6:1:12, January-February 1943.

Weightless suspension exercises can be progressed by careful graduation from simple suspension and relaxation up to resisted exercise for muscle toning. These exercises are all active, i.e., done by the patient, and so his cooperation and attention are ensured.

The apparatus and the aids which we find useful for such graduation may now be described. First there is the standard metal unit suspension frame from which the patient can be suspended wholly or partially.

The methods now in use for suspension exercise are as follows:

1. Relaxation as a preliminary to exercise, and interspersed with bouts of exercise.
2. Suspension for weightless exercise.
3. Auto-assisted exercise for joints.
4. Graduated resistance exercise for muscle training and muscle toning, making more and more effort to get the patient to work hard and to do it himself while he is carefully kept under supervision, so that adjustments and suspensions may be corrected.

The modern method of sling suspension exercise is an advancement on the older Swedish remedial exercise. The fundamental positions are used, such as lying, half-lying, sitting, stoop-stride-sitting, and so on, but whereas the usual remedial exercise is given for a short period after massage treatment, these newer exercises can be done at definite periods of the day.

There is an advantage in being able to select certain movements to train and tone up muscles for a particular type of work, and combined with occupational therapy in certain cases, the speed of recovery undoubtedly is greater in patients treated by occupational therapy only. Weightless exercise by the suspension unit is a means of giving a patient all the advantages of pool treatment, with the added advantage that it is dry, and so chill can be avoided and exercise can be given in recumbency while the patient is in a general condition unfit for hydrotherapy. As with all new ideas of treatment there tends to be a swing over abruptly from old methods to new, and some authorities advocate occupational therapy to the entire exclusion of physical therapy.

The Effective Stimulus for Increased Pulmonary Ventilation During Muscular Exertion

Julio M. Barman, Manoel F. Moreira, and Frank Consolazio. (From the Fatigue Laboratory, Harvard University, Morgan Hall, Soldiers' Field, Boston). In J. Clinical Investigation, 22:1:53, January 1943.

1. The increase in pulmonary ventilation has been studied in normal men exercising the limbs, first with normal circulation, and then with the circulation cut off by pressure from inflated cuffs.

2. Very light exercise (at a rate of 12 kilogrammeters per minute) of the flexors of the hand during total ischemia of the arms usually resulted in a smaller ventilation than when the arms had normal circulation. Release of the ischemia was followed at once by a marked hyperventilation.

3. In subjects walking uphill on a treadmill (at a rate of 700 kilogrammeters per minute for a 90 kilo subject), total ischemia of both legs resulted in a marked diminution of pulmonary ventilation, even though the nervous pathways were intact, and release of the ischemia was followed at once by a marked hyperventilation, much higher than the value prior to ischemia.

4. These results are interpreted to mean that the chemical stimulus for increased ventilation in exercise of these types is far more important than the reflex.

The Problem of Functional Disease as Seen in Industry

D. E. Bell, M. D., Chief Medical Officer, Workmen's Compensation Board, Ontario, Toronto. In Canad. Med. Assoc. J., Feb. 1943.

The author asked his colleagues at the Compensation Board for their opinion as to what proportion of the time lost following industrial injury is due solely to functional conditions.

The estimates he received ran from 15 to 25 per cent. In the year 1941 in the Province of Ontario alone, the man-day loss due to industrial injury was one and a quarter millions, making it readily apparent that we have here food for very serious thought.

A complete answer to the question of etiology involves consideration of a great many factors, including those tendencies which contribute to produce a psychopathic personality.

The injury, as a rule, is of minor importance; at times it would seem little more than an incident. The term "traumatic neurosis" is therefore really a misnomer. "Compensation neurosis" is much to be preferred, for, while trauma plays a very minor role, compensation plays a very large one.

A great many medical men, in their eagerness to treat the injury, neglect to treat the patient. Their surgical skill may be beyond reproach, yet it never occurs to them to question subjective symptoms even well after anatomical recovery appears to be complete. Worse still, they unwittingly lend themselves to the production of a functional state by careless remarks in the presence of the patient and his friends. Many a patient with avulsed transverse processes has been told he has a fractured spine instead of a muscle injury, and, of course, there are always friends who recall cases in which dire consequences followed such injuries, and some who may even know the amount of the pension received by so-and-so. To a patient the word of his medical attendant is the voice of experience and the confidence the physician holds should be used for constructive purposes rather than wasted in gloomy prognoses.

Now what is the answer to the problem? If the medical profession can be made to realize that it has a real live problem on its hands, an excellent start will have been made. Unfortunately, the attitude of many is that matters of psychology are outside the scope of the surgeon and something for the neurologist and psychiatrist to worry about. By the time, however, the neurologist or the psychiatrist is sent for, the case usually is too difficult and complicated to permit easy solution. Furthermore, any surgeon or physician who thinks he can ignore psychology as an agent of healing is passing up one of the most potent forces at his disposal.

The solution appears to lie in education of the profession and laity alike as to the existence of these states, the influences that favor their development, and how these influences may be counteracted. It is no disgrace to be a neurotic, yet, on the other hand, the patient does not need to be glamorized—and that is exactly what is happening every day.

Effect of Infra-red Heat on Localized Poliomyelitis and Neuritis

John A. Toomey, M.D., Cleveland, Ohio. In J. Pediatrics, 22:2:135, February 1943.

It has long been contended that since poliomyelitis is not in the muscle but in the nerve, every effort should be directed toward keeping the muscle in good condition, so that the nerve can have something to move when its function returns. This is best accomplished by some form of heat. In our instance, we used infra-red therapy, which causes capillary dilatation. Perhaps there is an increase in blood flow and, as a result, an increase in metabolic activity of the muscles. This might be accomplished by other means, such as by Kenny's hot foments, but the physiologic effect would be the same. That heat alone may be efficient therapy might be concluded by the results obtained in these nine cases, three of poliomyelitis and six of peripheral neuropathy (neuritis).

Despite apparent complete lack of movement in the three patients with infantile paralysis, these patients must have had some fibers left connecting the muscles with the nucleus of the seventh nerve, since these muscles could be moved voluntarily after treatment. No movement would have been obtained had all the cells of the nucleus of the seventh nerve been destroyed.

It seems obvious that with the method of passive massage, galvanic stimulation and infra-red heat, the patients responded and went on to a quick clinical cure.

One would like to believe that results obtained after the application of infra-red rays could be used as a point of differential diagnosis between poliomyelitis and peripheral neuropathy (neuritis). There are so many patients, however, who have partial involvements with paresis and not paralysis that such a test could not become a standard of differentiation; yet, with the facts in mind, one could get some idea of prognosis in varying conditions.

If the patient has a peripheral neuropathy, the prognosis is the prognosis of the whole patient. If he starts to recover generally, he will recover locally, and the recovery will be complete. We have had twelve such patients with facial involvements out of a total of seventy-four and all have recovered movement.

If the patient has obvious signs of poliomyelitis, including involvement of the facial nerves, and after three weeks following the disappearance of edema (which in itself may cause paralysis) there is no response after the application of heat, the prognosis becomes extremely guarded as to the return of function of the nerves and hence muscles.

If a patient with complete paralysis who has been diagnosed as poliomyelitis is still completely paralyzed long after edema ordinarily would have subsided, i.e., about three to four weeks, and, if a few months later, the patient gets a complete return of function of the involved muscles, the diagnosis of poliomyelitis becomes questionable and that of neuritis most probable.

The principle of applied heat in the early stages of poliomyelitis is not new. Osler recommended it years ago, and where possible, it has been used at City Hospital for the past twenty years in treatment of muscles supplied by involved nerves.

Nonspecific Therapy in Anterior Poliomyelitis: Preliminary Report on the Use of Vitamins B and E and Artificial Fever

Simon Stone, M.D., Manchester, N. H. In J. Pediatrics, 22:2:142, February 1943.

Summary and Conclusions

Vitamin B and vitamin E as found in wheat germ oil and artificial fever were used in the treatment of anterior poliomyelitis in the acute and subacute stages of the disease. None of the patients were immobilized during the acute stage, and sand bags and splints were used primarily for support to prevent excessive relaxation of affected muscles.

Twelve patients were seen in the acute or tender stage of the disorder. Six of these patients received artificial fever besides vitamin therapy and six received vitamin therapy only. None of the patients treated—all except one had paralysis of varying degree of severity—developed any deformities or contractures. The stage of muscle tenderness was greatly diminished in all cases, especially in those who received artificial fever combined with vitamin medication.

While thiamine chloride deficiency as a contributing etiologic factor in precipitation of an attack of anterior poliomyelitis cannot be established, its administration intravenously or intramuscularly during the acute stage appeared to exert a nonspecific beneficial influence on the patients' general condition and appeared to lessen the severity of the paresthesias displayed by these patients. It was found to be most effective when combined with artificial fever and given during the height of the fever.

Vitamin E appeared to lessen the tendency to development of fibrositis, produced increase in muscle tone in chronic patients, and possibly favorably influenced muscle regeneration in cases where the nerve supply has not been completely destroyed.

Artificial fever therapy was well tolerated by all patients in temperature range of from 102 to 105 F. during the acute and subacute stages of the disease. It helped to reduce muscle tenderness, relieved vasospasm and muscle spasm, improved circulation of spinal cord and brain by increasing oxygen supply to central nervous system, thus improving the nutritional states of neurons not completely destroyed by disease. When combined with vitamins B and E it brought rapid improvement of symptoms in patients displaying progressive fibrositis.

It is suggested that while vitamins B and E and artificial fever are nonspecific in their mode of action, they represent the most valuable adjuncts in the treatment of anterior poliomyelitis in the acute and subacute stages of the disease. They probably assist in regeneration of neurons partially affected by the virus, improve the patients' general sense of well-being and assist in prevention of excessive fibrosis, a frequent cause of deformities and contractures.

The Levator Ani, Coccygeus and Piriformis Muscles: Agents in the Causation of Coccygodynia, Superior Gluteal Pain and Sciatic Syndrome

Thomas Wilensky, M.D., New York, New York. In Amer. J. Surgery, LIX: 1:44, January 1943.

Massage originally was used to discover whether or not the digitally diagnosed muscle spasm could be relieved by this simple method. In the event that the patient does not show a definite degree of subjective improvement after the first four to six massages over a period of approximately two weeks, orthopedic or other consultation should be sought.

Thiele's series had an average of eleven treatments over an average period of eleven weeks.

Wilson, discussing Thiele's paper, pointed out the interesting finding that eight out of twenty-two patients in his series complained of pain in the lower portion of the abdomen. In every instance this pain followed the course of the iliohypogastric and ilioinguinal nerves and could be exaggerated by pressure on the piriformis muscle near its origin on the affected side. Six of this group of eight cases were relieved by massage of the piriformis muscle alone and the other two were cured by a combination of anal operation and massage.

Comment

Obviously there remains a great deal to be done and said concerning this general problem of low back pain, coccygodynia and sciatic syndrome. It has not been the intention of the writer, in this discussion, to give the impression that the described conditions and the indicated nerve-musculo-fascial relationships constitute definite clinical entities for which satisfactory treatment invariably can be delivered.

On the contrary it is the express purpose of this paper to emphasize the loose linkage of cause and effect as indicated for these states and to point out that so much of the evidence may be classed as circumstantial.

Nevertheless it is the author's conviction that the muscles and related structures herein considered can and do serve as direct or indirect causative agents in various cases of low back and sciatic syndrome pain. Therefore, all such states have not been adequately studied unless this consideration has been explored.

March Fractures

Howard E. Sweet, M.D., Camp Croft, South Carolina; Major, Medical Corps, Chief of Surgical Service, Camp Croft, and Wendell H. Kisner, M. D., Camp Croft, South Carolina, Major, Medical Corps, Assistant Chief of Surgical Service, Camp Croft. In J. Bone and Joint Surgery, 25:1:188, January 1943.

Treatment

The authors' treatment for this not uncommon condition is immobilization of the foot in a plaster boot for a period of four to eight weeks, depending on the roentgenographic findings of adequate callus formation. Following removal of the plaster boot, the patient is given one to two weeks of rest and physical therapy, and then is returned to full military duty. In several of these cases it has been necessary to readmit the patient to the Hospital for an additional week of rest and physical therapy, because of continued pain in the foot on weight-bearing.

In conclusion it should be pointed out that the incidence of march fracture is increasing, because of the rapid growth of the Army, and the making of a correct diagnosis is easy when this condition is kept in mind.

The Effect of External Temperature on Shock: An Experimental Study

By K. G. Wakim, M. D., Ph. D., and W. D. Gatch, M. D., Indianapolis. In J.A.M.A., 121:12:903, March 20, 1943.

In these unparalleled times, when injuries resulting in shock are not limited to our armed forces in combat zones all over the globe but also may occur *en masse* in our civilian population as a result of air raids or industrial accidents, a thorough investigation and careful appraisal of some of the methods employed in the treatment of shock are most timely. In the treatment of shock the application of heat is too much stressed. That not only warmth but heat is recommended for the treatment of shock can be inferred from the warning expressed in books that great care must be taken to prevent the infliction of severe burns from hot water bottles used on the person in shock.

This emphasis on the application of heat to shocked individuals made the authors interested in determining, experimentally, the influence of temperature on shock as well as the effect of heat on the survival time of shocked animals. From the evidence observed in their experiments, the authors learned that the application of heat or of cold greatly shortened the survival time of anesthetized animals in experimental shock, while the animals that were placed at room temperature and those placed on warm water bottles slightly above room temperature, after shock was produced, had a much longer survival time. An external temperature in the neighborhood of body temperature proved to be optimal.

Among the physiologic mechanisms which nature calls into play to compensate for the decrease in blood volume during shock is an immediate generalized peripheral vasoconstriction which brings about a reduction in the capacity of the vascular tree. This reflex vasoconstriction manifests itself in the blanching of the skin and contributes to the sensation of cold experienced by the individual in shock.

Excessive heat will do harm to the shocked organism in several ways:

1. It will produce a widespread superficial vasodilatation and distribution of blood to nonessential parts and thus counteract the protective natural reflexes that brought about peripheral vasoconstriction in the skin and neighboring tissues which are not so vitally in need of blood during the emergency of shock.
2. Excessive heat will increase the metabolism and the oxygen requirement of tissues.
3. Excessive heat is likely to increase perspiration and consequently promote dehydration.
4. The burns often produced when hot water bottles are applied to semicomatose patients are so familiar to the clinician that they need only be mentioned here.

Summary

The effects of various external temperatures in contact with control and experimentally shocked animals were investigated. Cold and heat proved to be deleterious to the life of animals in shock. An external temperature in the neighborhood of that of the mammalian body seems to be optimal for the survival of shocked animals. These findings justify the conclusion that as long as whatever is lost, whether it is plasma or whole blood, is not replaced, heating or chilling shocked animals is harmful, while keeping them comfortably warm contributes favorably toward their survival.

Problems of Neuroses in Industry

Ernest H. Capel, M.D., M.R.C.P., D.P.H. Medical Officer, Joseph Lucas Ltd. In Practitioner, CXLIX:6:354, December 1942.

Treatment—The treatment of accident neuroses should begin the moment an accident has been sustained, which is much the same as saying that treatment should be preventive. An accident is a psychological shock besides being a physical one, and unfortunately thoughtless handling and tactless remarks made at the time of the accident frequently increase this shock. The attitude of the company to its employee forms perhaps the most important part of the background upon which the accident is staged. That the employee should have confidence in his firm, know that he will get consideration, a fair deal and a secure future, is of the utmost importance. The tactless handling of patients by lawyers and insurance agents frequently antagonizes them and makes them fear the worst. Solicitors, anxious relations, and practitioners interested from the patient's own viewpoint, often do irreparable harm by exaggerating the possible consequences and suggesting possible ulterior motives on the part of the employer. The patient's own family practitioner frequently is to blame in exaggerating

the seriousness of the accident, partly to be covered if anything goes wrong and possibly to gain more kudos if all goes well. It is essential that a physical diagnosis and prognosis be made as early and as accurately as possible, and this should be conveyed exactly to the patient. There should be a strong suggestion of positive recovery and no mention of after-effects, except those that will reasonably be expected. In the case of minor injuries, immediate return to the same work whenever possible is desirable. In other cases rehabilitation on suitable work should be started as soon as possible. A few words of caution are necessary here. Although it is desirable to get a patient back to work as soon as possible, the return to a job that is "made" for the purpose, at which he obviously is not earning his pay and which he himself can see will never lead him back to his old work, will do more harm than good. It will merely serve to fix in his mind what he already fears, i.e., that he will never get back to his old job or earn full money again. Rehabilitation must lead a man step by step back to doing his old job. The steps must be explained to him and he must understand that he is himself responsible for recovery and getting from one step to the next. It is not always possible to arrange alternative work which will at the same time provide rehabilitation. In this case it is important that rehabilitation in some other form should be arranged and carried on, even though he continues to work.

Fifty Years of Progress in Pediatrics

H. C. Cameron, M.A., M.D., F.R.C.P., Physician and Physician-in-Charge, Children's Department, Guy's Hospital. In Clinical Journal, LXXII:1:1, January-February 1943.

The Common Cold

It is useless to hope that by means of any form of antiseptic we can sterilize the mucous membrane. The infecting agent is within the tissues, protected by mucus and ensconced in many inaccessible recesses and convolutions. Symptomatic relief often is obtained by sprays containing adrenalin or ephedrin, which shrink the mucous membrane and diminish congestion, perhaps thereby encouraging draining from the sinuses. In the early stages of the catarrhal process the feeling of dryness and heat, or the tight feeling in the chest, yields readily to the use of ipecacuanha or other expectorant by provoking freer secretion. Relief from the aches and pains can be secured by the salicylates or aspirin.

To minimize the tendency of some children to recurring infections we can rely only upon hygienic advice as well as upon such help as ultraviolet rays, cod liver oil, vitamins and systematic hot and cold douching of the whole body, can afford. We still must be content to endure the taunt that however much as a profession we know or do, we cannot prevent or cure a common cold.

"Shell Shock" and Effects of High Explosives

D. Denny-Brown, M.B., F.R.C.P. In J. Laboratory and Clinical Med., 28:4:509, January 1943.

With regard to treatment, I might say that most cases of emotional disorder will make a good recovery with persuasion, discussion, and suggestion. In many, some abreaction is essential. In severe cases, usually with bad personal previous history, an extensive investigation of their childhood anxieties is necessary, and in this type of case it is very difficult to get them back to duty involving explosions and bombing again. From the military point of view, the patients who are likely to get back to duty usually do so after quite simple treatment, provided their trouble is understood, provided there is time to go into their story and get down to the nature of their anxieties. They do not react well to faradic or simple suggestion.

Book Reviews

AN INTRODUCTION TO MATERIA MEDICA AND PHARMACOLOGY. By Hugh Alister McGuigan, Ph. D., M. D., Professor of Materia Medica, Pharmacology and Therapeutics, University of Illinois, College of Medicine, Chicago, and Elsie E. Krug, B. S., R. N., Science Instructor, St. Mary's School of Nursing, Rochester, Minn. Third Edition. Cloth. Price, $3.50. Pp. 779, with 83 illustrations. St. Louis: The C. V. Mosby Company, 1942.

A most important subject in the curriculum of schools of nursing is materia medica and pharmacology. This book is an outstanding text in these subjects for nursing schools.

Much of the nurse's work includes drug administration to patients and the use of various solutions and antiseptics in hospital routines. Even though drugs and solutions are prescribed under physician's orders, the nurse should have accurate knowledge of what these drugs will do, why they are administered, and their correct dosage.

The authors have emphasized the important and useful drugs. They have shown the action of the drugs from the animal experimentation standpoint.

The content of this edition has been rearranged to facilitate the finding of information and to provide for the study of drugs in relation to disease conditions for which they are given. Some chapters on chemistry of compounds have been omitted entirely or have been incorporated into other chapters of related material. Some new drugs have been included and some forms of therapy have been elaborated upon. The authors have placed emphasis on the responsibilities of the nurse and upon her obligation in prevention of the misuse of drugs.

This book can be highly recommended to schools of nursing and to the nurse as a reference book for continued study and reference throughout her professional life.

TREATMENT OF FRACTURES. By Guy A. Caldwell, M. D., F.A.C.S., Professor of Orthopedic Surgery, Tulane University of Louisiana School of Medicine, New Orleans. Cloth. Price, $5. Pp. 303, with 92 illustrations. New York and London: Paul B. Hoeber, Inc., 1943.

In this manual the author gives one or two procedures for each of the common types of fracture which have given good results in his experience. Line drawings are used throughout for illustrations. This leads to simplicity and enables the student and practitioner to select a simple procedure to treat a fracture rather than to evaluate the numerous gadgets and splints described by various authors for the treatment of simple and compound fractures.

This manual is not of interest to physical therapists as it pays little attention to physical therapy but should prove a good manual for medical students starting the study of the treatment of fractures.

PSYCHOSOMATIC MEDICINE. By Edward Weiss, M. D., and O. Spurgeon English, M. D. Cloth. Price, $8. Pp. 687, with illustrations. Philadelphia and London: W. B. Saunders Company, 1943.

This textbook, written by well qualified men in their respective fields of clinical medicine and psychiatry, fills a great breach in medical literature. For quite a few years the periodical literature has been replete with articles about the inter-relationship of somatic and psychologic disturbances. However, the great majority of these journals have been circulated among psychiatrists and hence did not reach that group of medical men who could profit mostly from such understanding. This book is an attempt to teach "the clinical application of psychopathology to general medical problems." It is not simply an armchair thesis but is the product of years of teaching of psychosomatic medicine to senior medical students. Hence it has a well worked out form and is written on a level which should be grasped readily by any physician and yet is not so simple as to be boring reading.

Although other textbooks of psychiatry adopt a psychosomatic point of view, this book is unique in its construction. The entire book deals with this and no attempt is made to introduce the formal psychiatric conceptions nor is there any great discussion of the psychoses. This is a great advantage in that the student is taught a true perspective of psychiatry in which the psychoses are the least common conditions encountered in psychiatry. In addition the form of the book follows more closely the lines of a textbook in medicine. The first two chapters introduce the subject of psychosomatic medicine and then discuss personality development and psychopathology—all in simple terms. It is pointed out that the purpose in the remainder of the book is "to demonstrate not so much that a medical problem is purely functional or only physical but that psychological and physical factors are both present and that the question becomes how much of the one and how much of the other and what is the relationship between them."

The following three chapters are devoted to the cardiovascular system in which there is an excellent section on hypertension. The discussion of the physiology and tissue pathology are so well correlated with the psychopathology that the authors' recommendations for treatment follow logically. In the same fashion the book deals with the gastro-intestinal system, the endocrine system and metabolism, the genito-urinary system and the sexual function and so on to cover the whole field of systemic disturbances and how they reflect psychologic stresses. Each section is amply clarified by detailed case histories which any physician can duplicate from his own practice without even thinking too hard about it. There is a timely chapter on military medicine. Finally there are three chapters on therapy in which are discussed such subjects as the general principles of psychotherapy; the treatment of disturbances in children such as thumbsucking and so on; the treatment of problems in adolescence, marriage, convalescence, et cetera; the use of special therapeutic procedures which more definitely fall into the realm of the psychiatrist.

This book is not only recommended to every physician, but the reviewer urges that it be read to complete the graduate's education in medicine. It should prove quite valuable as a reference work for the general practitioner when he is faced with a psychosomatic problem and is unable to evaluate it. The form of the book makes such reference easy.

The only criticism to be offered is that the authors have not hesitated to use freely psychoanalytic concepts and terminology. One cannot help but feel that to many novices in psychiatry the interpretations offered, although valid and acceptable, would seem so far-fetched as to nullify the value of the book. Although this in no way detracts from its real value, it is suggested that this excellent book could be improved by more simplified interpretations or even by their omission entirely. Such interpretations could be better treated in a book for more advanced study.

ORTHOPEDIC CONDITIONS AT BIRTH—NURSING RESPONSIBILITIES. By Jessie L. Stevenson, R. N., Consultant in Orthopedic Nursing, National Organization for Public Health Nursing. Paper. Pp. 80. Distributed free by The Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York, N. Y.

This handbook is intended to assist the nurse in the early recognition of orthopedic conditions which may be present at birth and in the care of patients with these disabilities. The cause, symptoms, pathology and methods of medical and surgical care of the various conditions have been briefly reviewed since it is believed that the nurse can meet her responsibilities more intelligently if she understands the nature of the condition and the entire plan of treatment.

This handbook is not intended to take the place of a textbook on orthopedic conditions but rather to present in concise form the essential details of treatment with special emphasis on the responsibilities of the nurse. This book should be of great value to every physical therapist. It is recommended that every physical therapist send for a copy.

NEUROSURGERY AND THORACIC SURGERY. Prepared and Edited by the Subcommittees on Neurosurgery and Thoracic Surgery of the Committee on Surgery of the Division of Medical Sciences of the National Research Council. Cloth, Price, $2.50. *Pp.* 310, *with illustrations. Philadelphia: W. B. Saunders Company,* 1943.

This manual is of interest to every physical therapist because of the chapter on injuries of peripheral nerves by Bryon Stookey, M. D., and John Scarff, M. D. This chapter discusses the incidence of injuries of nerves, anatomy, degeneration and regeneration of nerves; clinical manifestations of injury to nerves; general considerations—methods of examination; consideration of individual nerves; general principles of nerve repair; methods of repair which can be used; selection of procedure; preparation of nerve bed; technic of end-to-end suture; technic of nerve crossing; technic of nerve grafting; technic of nerve implantation; methods of repair to be avoided; and nonsurgical care following injury to nerves.

The whole chapter is of great value but physical therapists should read with interest the authors' consideration of preventive and corrective splinting; and physical therapy. Physical therapists will be interested to hear some of the thoughts of these authors: "Many devices have been invented with the thought that they might supersede the human hands as instruments of massage, but without success." "During the war of 1914-1918 the use of electricity received much attention and achieved excellent results in the treatment of the after-effects of injuries to the peripheral nerves, of injuries to the joints and of functional nervous conditions." "However, there is need for experimental work to show the actual value of the various forms of electrotherapy."

In physical and occupational therapy the authors discuss the use of thermotherapy, hydrotherapy, massage, constant current, faradic current, high frequency currents, common ion transfer, mechanotherapy and curative workshops. This manual should be used as a reference work for physical therapists treating peripheral nerve injuries.

INDUSTRIAL PSYCHOLOGY. By Joseph Tiffin, Ph. D., Professor of Industrial Psychology, Purdue University, Lafayette, Indiana. Cloth. Price, $4.65. *Pp.* 386, *with* 96 *illustrations. New York: Prentice-Hall, Inc.,* 1942.

The popular conception of industrial psychology is that it aims to develop more effective methods of production, using an established fund of psychological knowledge. Nothing could be farther from the truth. Industrial psychology does not deal with efficiency in production exactly. Neither does it apply existing psychological principles. It deals with tests and procedures facilitating employee selection, placement and promotion, the solution of visual problems, the reduction of accidents, the improvement of training procedures, and the development and maintenance of employee morale. It has grown up somewhat aside from theoretical psychology, and has helped to produce a substantial body of psychological knowledge not otherwise available to theoretical psychologists.

The present book, by one who has made original contributions to this field, is an authentic and well-organized presentation of the subject. To specialists in physical therapy it will bring important information about the effect of poor industrial organization on the rates and types of accidents, as well as methods of minimizing the effects of certain accidents and preventing certain others. From this angle, the physical therapist will discover how certain types of problems which come to her get to be what they are. From another angle, this book will give her new insight into how the retraining of patients could be brought about, using psychological—as well as physical—types of therapy.

THE KENNY CONCEPT OF INFANTILE PARALYSIS AND ITS TREATMENT. By John A. Pohl, M. D., Clinical Assistant Professor of Orthopedic Surgery, University of Minnesota; Attending Orthopedic Surgeon, Minneapolis General Hospital. In collaboration with Sister Elizabeth Kenny, Honorary Director the Elizabeth Kenny Clinics of Australia, Honorary Director the Elizabeth Kenny Institute, Minneapolis; Guest Instructor, University of Minnesoto Medical School. With a foreword by Frank R. Ober, M. D., President, The American Orthopedic Association. Cloth. Price, $5. *Pp.* 368, *with* 114 *illustrations. Minneapolis: Bruce Publishing Co.,* 1943.

This monograph on the Kenny concept of infantile paralysis is an up-to-date discussion of the technics now being advocated by Sister Elizabeth Kenny. The book is divided into three parts. Part one considers the definition and sypmtoms of the disease in its acute stage; examination of the patient, and the detection of spasm; analysis of neuromuscular conditions; nursing care; treatment of muscle spasm with the preparation and application of hot foments; the respiratory system and muscle stimulation. The convalescent stage is discussed in part two with chapters on an introduction to reeducation; muscle function, classification, type, action and synchronization of muscles; principles of treatment with practical considerations in the restoration of function in the neuromuscular system; restoration of function of the muscles of the neck, shoulder, forearm and hand, trunk, lower limbs and leg; balneotherapy and the treated patient. The chronic stage with the role of orthopedic surgery and artificial supports is the subject of a small third part.

It is generally agreed that Doctor Ober is correct when he states in his foreword: "If the Kenny technic, with its continuous superb nursing, is followed, the physician will find that the affected parts become soft and relaxed, limitation of motion is not so persistent, and pain subsides remarkably early as compared to other methods. The physical therapist will find that close application of the technic described in the book will gain the maximum amount of recovery more quickly and more satisfactorily than by technics previously employed."

This book should be read and studied by every physical therapist treating infantile paralysis.

PERSONALITY AND SEXUALITY OF THE PHYSICALLY HANDICAPPED WOMAN. By Carney Landis, Ph. D., Associate Professor of Psychology, Columbia University; Principal Research Psychologist, Psychiatric Institute and Hospital, New York; and M. Marjorie Bolles, Ph. D., Research Fellow, Psychiatric Institute and Hospital, New York. Cloth. Price, $3. Pp. 161. New York: Paul B. Hoeber, Inc., 1942.

The authors present an interesting approach to the problem of personality and sexuality in physically handicapped women. It is a rather carefully done piece of work and serves to rectify considerable misconception about the subject. The hypothesis they wished to test was whether or not the psychosexual component in personality development is modified and changed by the presence of the physical handicap and if so, whether such changes influence the form and nature of personality adjustment in adult life.

The cases in the study consisted of 25 orthopedic disabilities, 25 spastics, 25 chronic cardiacs and 25 epileptics. In all the handicap appeared before the age of 13 and it varied from an overt difficulty to only the subjective knowledge of it. The age of the group varied from 17 to 30.

The conclusions reached were: (1) There is no characteristic personality manifested by any particular type of disability. This is especially noteworthy because of the popular misconception of the so-called epileptic personality. (2) The personality of any type of physically handicapped woman is characterized by psychological immaturity and hyposexuality. (3) As a rule these women show an intense emotional attachment to parents and this is "primarily attributable to a continuation of an habitual mode of response set up in childhood and not to the fact of the handicap in adult life, even though the latter may be a reinforcing agent." (4) Although there is psychosexual immaturity in many of these girls it is not accompanied by commonly recognized types of mental disorders, such as neurosis or psychosis. There also are some interesting comments regarding the lack of significance of sex in the determination of the adult personality.

This small book is clearly written and can be recommended to anyone working with handicapped people for the insight it will give regarding the interests and problems of these patients.

THE KENNY TREATMENT FOR INFANTILE PARALYSIS. By Robert Bingham, M. D., Capt., Medical Corps, Army of the United States. Boards. Pp. 50. Camp Van Dorn, Miss.: The author.

This is an orthopedic report and comparison of results on 48 cases treated by the Kenny method. The author states that in this series the patients were more comfortable, had better general health and nutrition, were more receptive to muscle training, required a shorter period of bed rest and hospitalization, and had fewer deformities with less residual muscle weakness and paralysis when treated by this method.

REHABILITATION OF THE TUBERCULOUS. By H. A. Pattison, M. D., F. A. C. P. Cloth. Price, $2.50. Pp. 186, with illustrations. Livingston, Columbia County, New York: The Livingston Press, 1942.

The question as to the best method of helping the tuberculous to return to a life of economic security, while still guarding against the danger of overfatigue, unhealthy types of labor, unsanitary conditions in the workshops and the home, and mental unrest, has been most difficult to solve. Employment in sanatoria, farm colonies and sheltered workshops has been tried for years with results of value. A logical goal to strive for is the return of the patient to the type of industry in which he was employed before his illness, thus to preserve the benefits of training and experience. To reach this goal, the job must be investigated, and often the patient must be trained to go back to a phase of the job that is modified, so as to protect him from all conditions that may cause a reactivation of the disease.

The author of this book, Dr. Pattison, has devoted a quarter of a century to the study of this problem. All phases of the problem are considered, including sanatorium treatment, vocational training, placement, compensation, family relief, marriage of the tuberculous, the mental aspects of the disease, allergy and immunity, and the human constitution as it relates to tuberculosis. In the second part the author discusses in-sanatorium education and describes and gives excellent illustrations of the various programs and projects, including those in the United States, England, Holland and Switzerland. This book should be read by both physicians and laymen interested in tuberculosis.

AIDS TO THE INVESTIGATION OF PERIPHERAL NERVE INJURIES. Medical Research Council: Nerve Injuries Committee. M.R.C. War Memorandum No. 7. Paper. Price, 60 cents; 2 s. Pp. 48, with 74 illustrations. New York: British Information Services; London: His Majesty's Stationery Office, 1942.

This booklet should be in the library of every physical therapist treating peripheral nerve injuries. The committee points out that a muscle may contract as a prime mover, as a fixator, as a synergist or as an antagonist. Thus the flexor carpi ulnaris acts as a prime mover when it flexes the wrist; as a fixator when it contracts to fix the pisiform bone for the action of the abductor digiti minimi; as a synergist when the wrist is actively extended; and as an antagonist when the fingers, but not the wrist, are extended. In certain conditions muscles may continue to act in one of these ways, but not in others.

The pictures usually show only one method of testing each muscle; this is the one which seemed the simplest and most generally useful. These illustrations are excellent. The same diagrams show the origin and distribution of the peripheral nerves with the muscles which they supply, and other diagrams illustrate the approximate area within which sensory changes may be found in lesions of the peripheral nerves.

PHYSIOLOGICAL PSYCHOLOGY. By S. R. Hathaway, Ph. D., Associate Professor of Psychology and Clinical Psychologist, Neuropsychiatric Division, University of Minnesota Hospitals. Price, $2.75. Pp. 251, illustrated. New York: D. Appleton-Century Company, 1942.

This is an excellent text written, as the author states, for the psychologist. The aim of the writer has been to show the dependence of psychology on the allied sciences of physiology, anatomy and chemistry, and this has been splendidly accomplished.

Advanced knowledge of the determinants of behavior has forced scientists to look to the central nervous system in an attempt to explain the observable facts of behavior. A dynamic knowledge of those mechanisms of the body which are chiefly responsible for human behavior is the best balance against unchecked speculation.

While this volume has been written primarily for the student of psychology it should prove of real value to the general practitioner. It is an excellent review of the central nervous system both anatomically and physiologically. In addition to being well illustrated, the text is very interestingly written, and there is a small but choice bibliography. This volume should be in the library of the general practitioner.

SILENT ENEMIES: THE STORY OF THE DISEASES OF WAR AND THEIR CONTROL. By Justina Hill. Cloth. Price, $2.50. Pp. 266. New York: G. P. Putnam's Sons, 1942.

The author is a distinguished bacteriologist at Johns Hopkins and also has written "Germs and the Man." This is a most interesting book; every chapter is packed with knowledge that can be read by everyone with profit. The author does not distort accuracy and truth, but does translate scientific jargon into everyday English for the benefit of the general reader. The volume is divided into eight parts: jungle germs, discussing malaria and yellow jack; out of the east: typhus, plague, cholera and assorted nuisances; through shot and shell considering wounds, burns, and blood transfusions; air raid shelters and training camps; the deadly droplets of respiratory infection; filth diseases such as typhoid, paratyphoid and dysentery; the end of ignorance, the control of venereal diseases; versatile viruses such as mumps, measles and encephalitis; and our present status.

The chapter on "typhus, fleas versus lice" is just one of the chapters that makes this a singularly sprightly book. A few quotations illustrate this. "The characteristic pose of Napoleon with his fingers in his vest has long been attributed by the vulgar to the presence of body lice upon His Imperial Majesty's person. This is a fitting symbol of the devastating influence of louse-linked typhus on military history." In discussing the typhus vaccination in Europe, the author says: "The Germans had refused to vaccinate the inhabitants of the ghettos. If this is confirmed, it will be as hideous an atrocity as any Herr Hitler has perpetrated." Typhus again is following the trail of battle but Hill cautions us that we should not think of ourselves as separated from typhus by thousands of miles of ocean. We have on this hemisphere three forms of typhus.

"We harbor in our own country a second kind, murine or rat typhus." In this typhus the vector is the rat flea and man can be infected when the flea jumps in the wrong direction. "It is possible that all rodents can be infected with typhus."

Two other forms of typhus exist in this hemisphere: Brill's disease—a mild typhus not associated with lice, harbored for years by victims of the disease. The fourth kind of typhus is found in Mexico, tabardillo, transmitted by the louse.

The author states: "The peculiar fact seems to be that certain individuals are more attractive to lice than others. Barber tells the story of a louse put in the middle of a card table with a soldier on every side. Invariably, the louse headed straight for one man, no matter how many times the positions were changed."

This book is highly recommended to men and women in the services and their families as giving a straightforward discussion, in general and in detail, about the diseases intensified by war, especially infections.

INTRODUCTION TO MEDICAL SCIENCE ON A BASIS OF PATHOLOGY. By Charles G. Darlington, M. D. Professor of Pathology, New York University College of Dentistry; Pathologist and Bacteriologist, Muhlenberg Hospital, Plainfield, N. J.; Pathologist, Beekman Hospital, New York; Pathologist, Somerset Hospital, Somerville, N. J., and Grace G. Appleton, M. A., R N., Director of Curriculum and Teaching, Muhlenberg Hospital, Plainfield, N. J. Cloth. Price, $3. Pp. 446, with 170 illustrations. Philadelphia: J. B. Lippincott Company, 1942.

This book furnishes a connecting link between the basic sciences given in the nursing student's first term and the clinical courses in medical and surgical nursing which follow in the program. At this point in her preparation, pathology gives the nurse a general survey of medical science.

In general the authors have followed the suggestions of "A Curriculum Guide for Schools of Nursing." Part one gives a picture of the historical development of medicine; the causes, classification and manifestations of diseases; diagnostic procedures; and the treatment, control and prevention of disease. Part two presents the pathology of disease arranged according to the systems of the body. Part three covers the fundamental clinical laboratory procedures.

Throughout this book individual subjects are arranged for correlation with medical and surgical nursing and with other courses, such as microbiology, gynecology, urology, pediatrics and orthopedics. The authors have included material which will serve to stimulate further investigation and study by the individual, both as student and graduate. Much material has been given that will be useful for reference throughout the nurse's whole experience. This book can be recommended both in scope and presentation as a necessary textbook in schools of nursing.

PRELIMINARY REPORT ON CHILDREN'S REACTIONS TO THE WAR. By J. Louise Despert, M. D. Paper. Pp. 92. New York: New York Hospital and the Department of Psychiatry, Cornell University, Medical College, 1942.

The author felt that with the advent of the United States into the war it might be expected that anxiety would be aroused in children as well as in the general population. She thus studied the specific reactions to war stimuli in children who previously had been subjects of investigation in the nursery school set-up at the New York Hospital. She contrasted their responses to the war situation with those of anxiety and fear seen in normal young children. The writer reviewed many of the British reports on actual case histories in which children responded to impending danger as well as the reality situation in the region of the bombings.

It was felt that the anticipation of a possible evacuation created feelings of insecurity which were most important in the production of symptomotology. The psychological effects of bombings appeared to be less than those from the preceding evacuation maneuvers. There was little emotional response to placement of children in reception centers other than the rather general justifiable feelings of insecurity caused by separation of children from their parents. There was definitely a greater percentage of casualties in children over six years of age. The children responded best to the direct challenge of a reality situation no matter how painful.

This publication is of commendable value in view of the present world situation.

ORTHOPEDIC NURSING: CONTENT AND METHOD OF THE TEACHING PROGRAM IN SCHOOLS OF NURSING. By Carmelita Calderwood, R. N., Consultant in Orthopedic Nursing, National League of Nursing Education. Paper. Pp. 64. Published and distributed by Joint Orthopedic Nursing Advisory Service, 1790 *Broadway, New York,* 1942.

This booklet is prepared to assist the nurse engaged in teaching orthopedic nursing. It is not intended to replace an orthopedic nursing text. It shows the organization of a ward teaching program in orthopedic nursing. It gives the methods of ward instruction and something of the philosophy underlying ward teaching as a whole. The booklet can be highly recommended to all schools of nursing.

Chapter Directory

California Chapter

President, Mrs. Margery L. Wagner. Univ. of California Hospital, San Francisco, Calif.
Secretary, Marjorie M. Dennen, 416 Hawthorne Ave., Oakland, Calif.

District Chairmen:
Southern California: Bess D. Bernhard, 1327 Dorothy Drive, Glendale, Calif.
Northern California: Florence C. Burrell, 1304 Bayview Place, Berkeley, Calif.
Santa Barbara: Virginia Horsley, 1129 E. Meta St., Ventura, Calif.

Carolina Chapter

President, Mary C. Singleton, Duke Hospital, Durham, N. C.
Secretary, Lt. Margaret Whitehurst, Station Hospital No. 2, Fort Bragg, N. C.

Central New York Chapter

President, Mrs. Thelma Curley, Percy Hughes School, Jamesville Ave., Syracuse, N. Y.
Secretary, Mrs. M. Stell Murphy, 219 Genesee St., Utica, N. Y.

Colorado Chapter

President, Esther Wilcox, 1307 Franklin, Denver, Colo.
Secretary, Mrs. Alice Swanson, 1254 St. Paul, Denver, Colo.

Connecticut Chapter

President, John O,Donnell, Yale University, Dept. of Health, New Haven, Conn.
Secretary, Mildred V. Grillo, 29 French Town Road, Bridgeport, Conn.

District of Columbia Chapter

President, Ruth E. Preston, 1733—20th St., N. W., Washington, D. C.
Secretary, Laura W. Field, Sibley Memorial Hospital, Washington, D. C.

Eastern New York Chapter

President, Marguerite Stillman, 17 Dove St., Albany, N.Y.
Secretary, Grace L. Berry, 124 Rosa Road Schenectady, N.Y.

Georgia Chapter

President, Mrs. H. J. Price, Emory University, Ga.
Secretary, Alice Lou Plastridge, Warm Springs Found., Warm Springs, Ga.

Illinois Chapter

President, Dorothy Dean, 33 E. Division St., Chicago, Ill.
Secretary, Irene Anderson, 33 E. Division St., Chicago, Ill.

Indiana Chapter

President, Adelaide L. McGarrett, James W. Riley Hospital, Indianapolis, Ind.
Secretary, Shirley M. Cogland, 1924 N. Talbot St., Indianapolis, Ind.

Iowa Chapter

President, Loraine Frost, 15 W. Davenport Street, Iowa City, Iowa.
Secretary, Lucia Forestiere, Children's Hospital, Iowa City, Iowa.

Louisiana Chapter

President, Mrs. Marion B. Stewart, 5421 St. Charles Ave., New Orleans, La.
Secretary, Ruth Langley, 1210 Peniston Street, New Orleans, La.

Maine Chapter

President, Florence Orr, 489 State St., Bangor, Me.
Secretary, Lillian Shotter, Vet. Adm. Fac., Togus, Me.

Maryland Chapter

President, Edith Nyman, Johns Hopkins Hospital, Baltimore, Md.
Secretary, Evelyn M. Byrd, University Hospital, Baltimore, Md.

Massachusetts Physiotherapy Association, Inc.

President, Mildred L. Evans, 234 Marlborough St., Boston, Mass.
Secretary, Evelyn F. Moore, 234 Marlborough St., Boston, Mass.

Michigan Chapter

President, Marcia Shaw, 464 Maplehurst, Ferndale, Mich.
Secretary, Helen M. Lahey, 709 Hazelwood, Detroit, Mich.

Minnesota Chapter

President, Lucille Daniels, 2515 Nicollet Ave., Minneapolis, Minn.
Secretary, E. Othelia Johnson, 1736 Lincoln Ave., St. Paul, Minn.

Missouri Chapter

President, Dorothy H. Hansman, 5346 a Loughborough, St. Louis, Mo.
Secretary, Mr. Carroll J. McAllister, 9032 Rosemary Avenue, St. Louis, Mo.

New Jersey Chapter

President, Mrs. Frances Gill, Beth Israel Hospital, Newark, N. J.
Secretary, Laurel Moore, 176 Woodland Ave., Verona, N. J.

New York Chapter

President, A. Garman Dingwall, 191 Claremont Ave., New York, N. Y.
Secretary, Caroline B. Dunne, 617 W. 170th Street, New York, N. Y.

Ohio Chapter

President, Mrs. Mary L. Deatherage, 513 Malvern Road, Akron, O.
Secretary, Mrs. Celia T. Ruebensaal, Mt. Sinai Hospital, Cleveland, Ohio.

District Chairmen:
Northern District: Adelaide Fowler, Y.W.C.A., Cleveland, Ohio.
Southern District: Mrs. Frances S. Turner, 3111 Johnstown Rd., Columbia, Ohio.

Oregon Chapter

President, Jennie Hunter, 4005 S. E. Stark, Portland, Oregon.
Secretary, Hazel G. Hardy, 574 N. Lombard, Portland, Ore.

Pennsylvania Physiotherapy Association, Inc.

President, Nevin R. Kressley, 111 North 49th St., Philadelphia, Penna.
Secretary, Alene C. Engstrom, 811 Old Lancaster Road, Bryn Mawr, Penna.

Rhode Island Chapter

President, Arleen Ward, 21 Lillian Ave., Providence, R. I.
Secretary, Isabelle O'Hern, 81 Sumter St., Providence, R.I.

Tennessee Chapter

President, Mildred Heap, Vanderbilt University Hospital, Nashville, Tenn.
Secretary, Mrs. Gladys Stone, 2622 W. Ashland Ave., Nashville, Tenn.

Territory of Hawaii Chapter

President, Mrs. Barbara N. Campbell, Shriner's Hospital, Honolulu, T. H.

Secretary, Barbara White, Queen's Hospital, Honolulu, T. H.

Texas Chapter

President, Kathryn F. Brown, John Sealy Hospital, Galveston, Texas.
Secretary, Verna Mae Schuster, Memorial Hospital, Houston, Texas.

Virginia Chapter

President, Alice N. Jones, 318 W. Franklin St., Richmond, Va.
Secretary, Elsa M. Lange, 1536 West Avenue, Richmond, Va.

Washington Chapter

President, Mrs. Miriam M. Madison, 6652 E. Greenlake Way, Seattle, Wash.
Secretary, Helen C. Anderson, 1221 Taylor Avenue, Seattle, Wash.

Western Michigan Chapter

President, Elizabeth Murphy, Ann J. Kellogg School, Battle Creek, Mich.
Secretary, appointment pending.

Western New York Chapter

President, Mrs. Eloise Landis, 345 Bedford Ave., Buffalo, N. Y.
Secretary, Catherine Baldwin, 422 Marilla St., Buffalo, N. Y.

Wisconsin Chapter

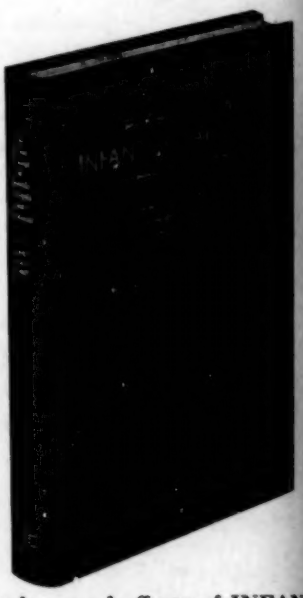
President, Fae Henry, 1418 Virginia Ave., Sheboygan, Wisc.
Secretary, Lelia Hoaglin, 916 New York Ave., Sheboygan, Wisc.

An old disease takes on new entity:

The Kenny Concept of

INFANTILE PARALYSIS

and its Treatment



By JOHN F. POHL, M. D.

In Collaboration With

SISTER ELIZABETH KENNY

Foreword by

FRANK R. OBER, M. D.

THE CONCEPT: A completely new theory of the symptomatology and effects of INFANTILE PARALYSIS. It is the result of thirty years of keen observation, meticulous study and diligent labor by Sister Kenny. Without doubt it is the most important contribution ever made toward the control of this dread disease.

BASIS OF PROOF: Clinical results over a period of several years, both here and abroad, are direct evidence of the success of Sister Kenny's treatment. Her work has been approved by practically the entire medical profession. The National Foundation for Infantile Paralysis endorses it. Eminent orthopedic surgeons accept and praise it.

THE TREATMENT: Step by step, this new book on INFANTILE PARALYSIS takes the reader through nearly four hundred pages of detailed instructions in Sister Kenny's treatment, with more than one hundred explanatory photographs. While the book is designed for easy reading, it is distinctly a textbook for the medical profession. Every physician should own a copy. In his hands it becomes a weapon of defense on the Home Front.

Size 6x9 inches. Cloth Bound.

368 pages. 114 Explanatory Photographs.

PRICE, $5.00 postpaid

▼

BRUCE PUBLISHING COMPANY

Medical Publications

SAINT PAUL **MINNEAPOLIS**

Bruce Publishing Company
2642 University Avenue
Saint Paul, Minnesota

Please enter my order for a copy of The Kenny Concept of Infantile Paralysis and Its Treatment, by Pohl and Kenny, at $5.00.

I am enclosing $ ..... for ..... copies
I will pay for the above ordered copies, C.O.D. parcel post, plus postage, when delivered by postman.

Name .....

Address .....

The American Physiotherapy Association

VOCATIONAL SERVICE
For members of the Association.

Apply to (Mrs.) Helen W. Eckersley
737 N. Michigan Ave
Chicago, Ill.

PHYSICAL THERAPY

This concise reference text on history contains information formerly unavailable within the scope of a single volume. It discusses:

I. Physical Therapy from Ancient Times to the Renaissance.
II. Massage and Exercise.
III. Water.
IV. Electricity.
V. Radiant Energy.

By John S. Coulter, M. D., Assistant Professor of Physical Therapy, Northwestern University Medical School, Chicago.

No. 8, Clio Medica; A Series of Primers on the History of Medicine, Published by Paul B. Hoeber, Inc. Cloth. Pp. 142, with 15 illustrations. Price $1.50.

This book may be purchased through the Business Office of

The Physiotherapy Review, 737 N. Michigan Ave., Chicago, Ill.

BOSTON UNIVERSITY

SARGENT COLLEGE OF PHYSICAL EDUCATION

TWO-YEAR COURSE IN PHYSICAL THERAPY

Given with the Cooperation of the B. U. School of Medicine

A two-year major course in physical therapy is open to students who have completed the first two years of the college program or the equivalent. The degree of B. S. in Physical Education, as well as a certificate in physical therapy, is given upon completion of the course.

A nine-month course also is offered to graduates of accredited schools of physical education or nursing. Sargent College is on the accredited list of the American Medical Association and of the American Physiotherapy Association.

For further information, address Nelson S. Walke, Ph. D., Dean

22 Everett Street
CAMBRIDGE, MASSACHUSETTS

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

PHYSICAL THERAPY COURSE

Under the direction of John R. Coulter, M. D., Associate Professor of Physical Therapy, and Miss Gertrude Beard, R. N.

Nine Months Course—Beginning July 1, 1943, and September 29, 1943. Open to graduates of accredited schools of nursing and physical education and to applicants who have 90 college semester hours, 26 of which are in the biological sciences, physics and chemistry. Thorough courses are given in the fundamental subjects. Credit toward a degree is granted.

For application blank and further information address

DEAN OF NORTHWESTERN UNIVERSITY MEDICAL SCHOOL
303 East Chicago Ave., Chicago, Ill.

D. T. Watson
School of Physical Therapy

affiliated with

University of Pittsburgh
School of Medicine

Course in Physical Therapy

Instruction—6 months
Supervised practice—6 months
Registration each January and July
Tuition $200

For information address

Jessie Wright, M. D.
Sunny Hill, Leetsdale, Pennsylvania

OFFICIAL INSIGNIA
THE AMERICAN PHYSIOTHERAPY ASSOCIATION

The PIN (ACTUAL SIZE)

The official pin of the Association is made of 1/10 of 10 karat gold-fill with blue enamel outline. Price,

$3.50 Including Federal tax and mailing charge. (Subject to change without notice.)

The EMBLEM

(Exactly the same—but four times as large as the pin.)

Distinctive in its colors of gold and navy on white cloth. Each,

25c

May be secured from
American Physiotherapy Association, 493 Californic Ave., Palo Alto, Calif.